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M E M O R A N D U M

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: September 27, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A broad upper-level trough of low pressure located over the southern Gulf of Mexico is transporting deep tropical moisture northward into Florida which will contribute to heavy rainfall across sections of the interior through Thursday. On Tuesday, the greatest rainfall is expected to occur along the east coast. Some of this rainfall could be significant at a local or even a regional scale with potential local maxima of 5 inches. The greatest shower and thunderstorm activity will shift toward the southwest coast on Wednesday and Thursday. Late in the week, an upper-level trough originating from northeastern U.S. will send a frontal boundary into the northern Gulf of Mexico and western Atlantic. While the front approaches, somewhat cooler but strong northeasterly winds will blow over the warm waters of the western Atlantic which will produce heavy rainfall along the east coast this weekend. Above average rainfall is anticipated each day this week, contributing to weekly rainfall that will likely be over double what is expected this time of the year.

Kissimmee

Releases were made from East Lake Toho and Lake Toho as needed to allow lake stage to rise with but not exceed their respective regulation schedules. Weekly average discharge on September 24, 2023, was 220 cfs and 310 at S-65 and S-65A, respectively. Mean weekly water depth on the Kissimmee River floodplain increased by 0.80 feet to 0.26 feet over the week ending September 24, 2023. The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 4.8 mg/L last week to 4.6 mg/L for the week ending September 24, 2023, which is above both the potentially lethal level and the level that is physiologically stressful for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 15.47 feet NGVD on September 24, 2023, which was 0.06 feet higher than in previous week and 0.12 feet higher than a month ago. Average daily inflows (excluding rainfall) increased from the previous week, going from 2,130 cfs to 3,410 cfs. Average daily outflows (excluding rainfall) decreased from the previous week,

going from 1,460 cfs to 350 cfs. The cyanobacteria index level was low to moderate in the western region of the Lake according to the September 22, 2023, satellite image from NOAA's Harmful Algal Bloom Monitoring System. Routine phytoplankton monitoring on September 18 - 20 did not detect microcystins at any sampling stations. A low concentration of anatoxin-a (0.34 µg/L) was detected at the POLESOUT station in the northwestern part of the Lake. Phytoplankton communities were dominated by *Microcystis aeruginosa* at 7 stations and *Planktolyngbya limnetica* at 5 stations, and the remaining 20 stations had mixed communities.

Estuaries

Total inflow to the St. Lucie Estuary averaged 860 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at US1 and A1A Bridge, while the HR1 gauge was not functioning properly and will be undergoing maintenance this week. Salinity in the middle estuary was in the optimal range (5-10) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 3,540 cfs over the past week with 290 cfs coming from Lake Okeechobee. Mean salinities decreased at all sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral and Shell Point (10-25), and in the upper stressed range at Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, September 24, 2023, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2024 (since May 1, 2023) is approximately 2,200 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 779,000 ac-feet. Most STA cells are above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in effect in STA-1W Northern Flow-way, STA-2 Flow-ways 2 and 4, STA-3/4 Eastern Flow-way, and STA-5/6 Flow-way 4 for vegetation management activities. An additional restriction is in effect in STA-2 Flow-way 3 for canal plug refurbishments. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

WCA-2A and -3B experienced an elevated or "poor" ascension rate last week due to above average rainfall. Depths went from below to above average in WCA-2A very quickly. Above average depths in northeastern WCA-3A remain indicative of the potential for better wading bird nesting next year compared to the last two years. Stages increased across Taylor Slough last week and remain above the historical average. Salinity decreased on average across Florida Bay last week but remains above the historical average, especially in the west.

Biscayne Bay

Total inflow to Biscayne Bay averaged 1,450 cfs and the previous 30-day mean inflow averaged 950 cfs. The seven-day mean salinity was 24.2 at BBCW8 and 18.9 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On September 24, 2023, mean daily lake stages were 56.9 feet NGVD (0.0 feet schedule) in East Lake Toho, 53.9 feet NGVD (0.0 feet schedule) in Lake Toho, and 51.4 feet NGVD (0.0 feet schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending September 24, 2023, mean weekly discharge was 220 cfs and 310 at S-65 and S-65A. Mean weekly discharge from the Kissimmee River was 750 cfs at S-65D and 830 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.2 feet NGVD at S-65A and 27.8 feet NGVD at S-65D on September 24, 2023. Mean weekly river channel stage increased by 0.9 feet to 34.0 feet NGVD over the week ending on September 24, 2023 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain increased by 0.08 feet to 0.26 feet over the week ending September 24, 2023 (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 4.8 mg/L the previous week to 4.6 mg/L for the week ending September 24, 2023 (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Follow the IS-14-50 discharge plan for S-65/S-65A; maintain at least minimum flow (250-300 cfs) at S-65A. Maintain current headwater stage at S-65D for the time being.

Table KB-1. Average discharge for the preceding seven days, Sunday’s average daily stage, and Sunday’s average daily departure from KCOL flood regulation lines or temporary schedules. All data are provisional.

Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) ^a	Schedule Type ^b	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							9/24/23	9/17/23
Lakes Hart and Mary Jane	S-62	LKMJ	7	60.0	R	60.0	0.0	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	7	60.9	R	61.0	-0.1	-0.2
Alligator Chain	S-60	ALLI	86	63.2	R	63.2	0.0	-0.2
Lake Gentry	S-63	LKGT	92	61.0	R	61.0	0.0	-0.2
East Lake Toho	S-59	TOHOE	150	56.9	R	56.9	0.0	-0.2
Lake Toho	S-61	TOHOW S-61	380	53.9	R	53.9	0.0	-0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	220	51.4	R	51.4	0.0	-0.1

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.

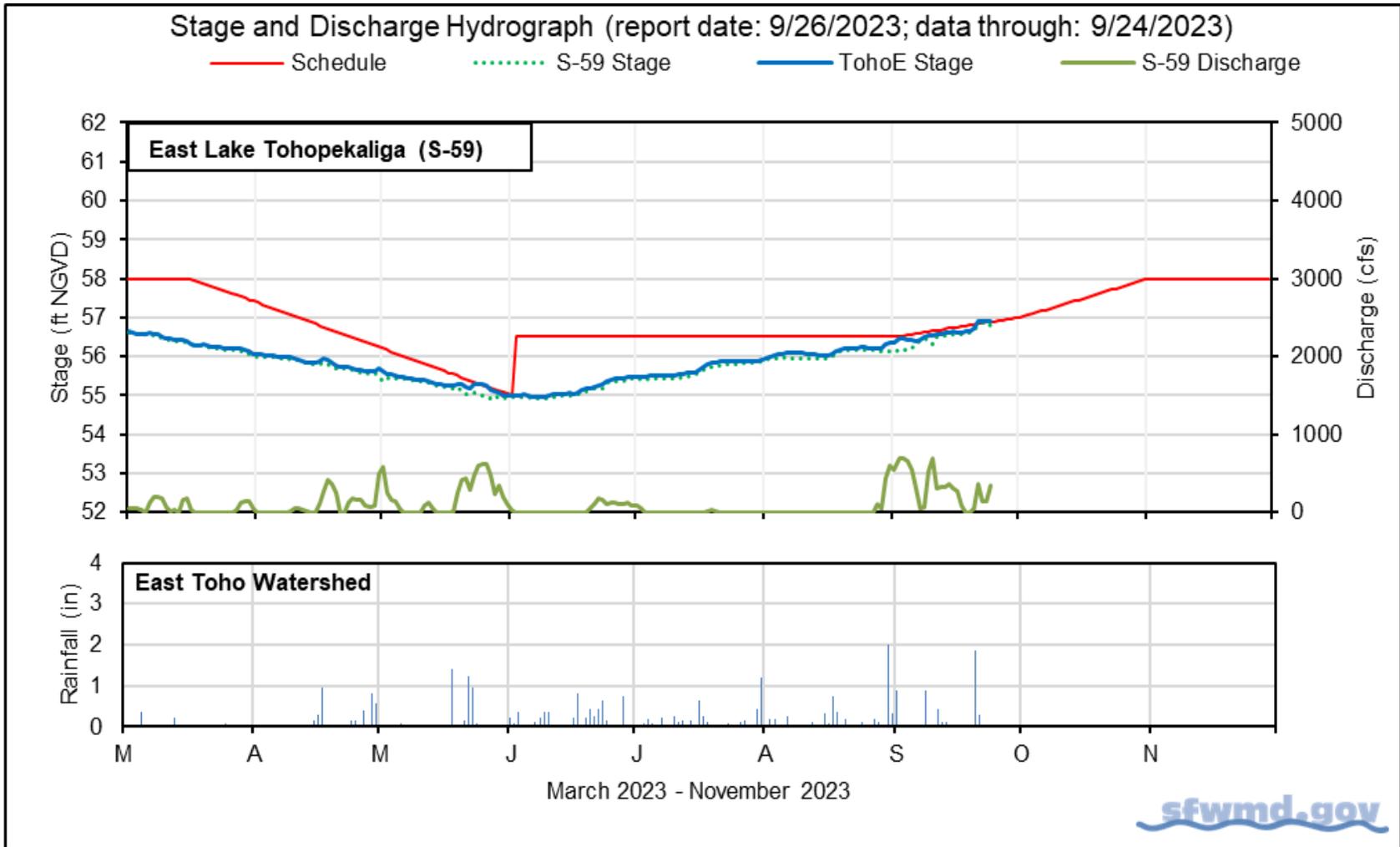


Figure KB-1. East Lake Toho regulation schedule, stage, discharge, and rainfall.

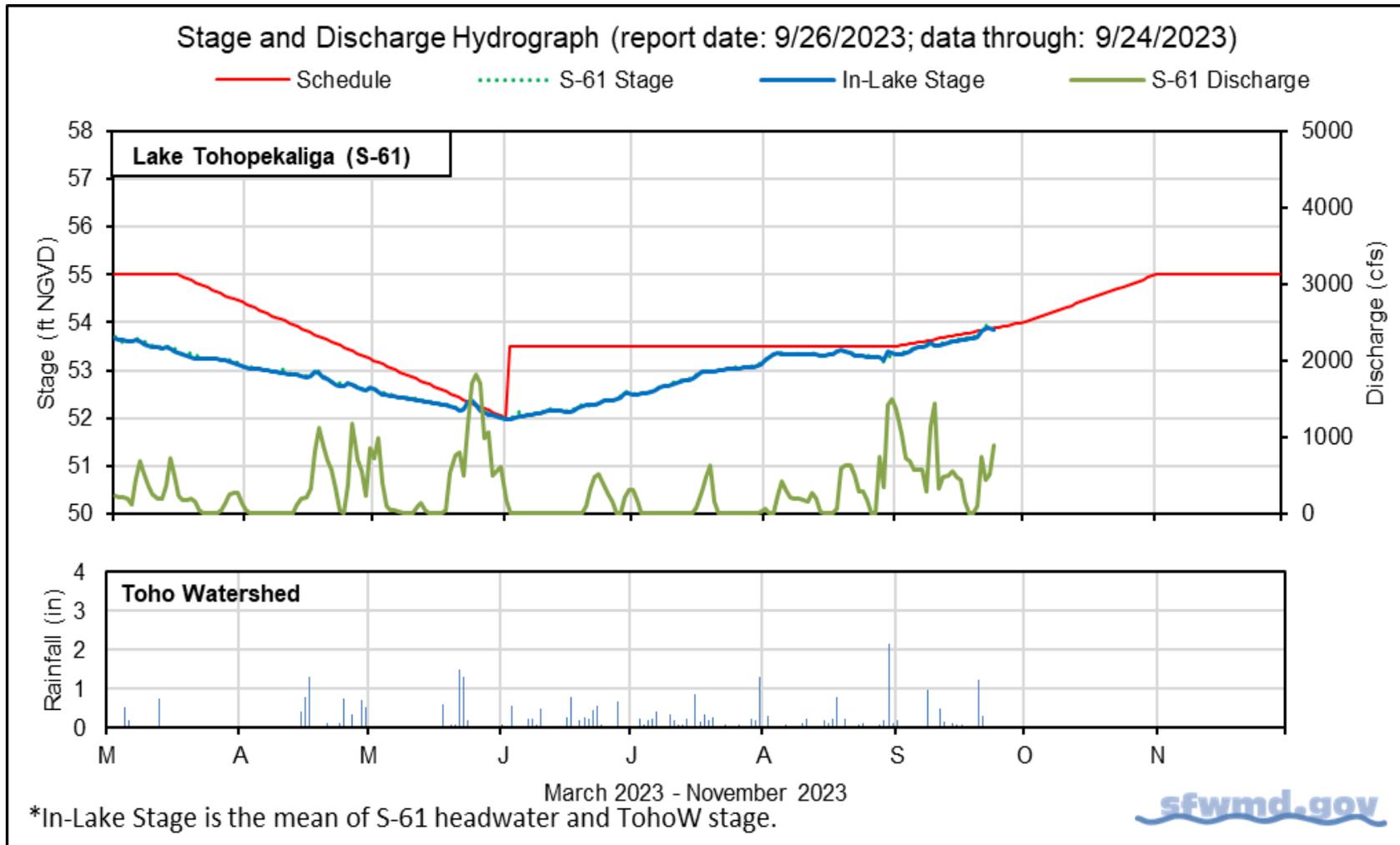


Figure KB-2. Lake Toho regulation schedule, stage, discharge, and rainfall.

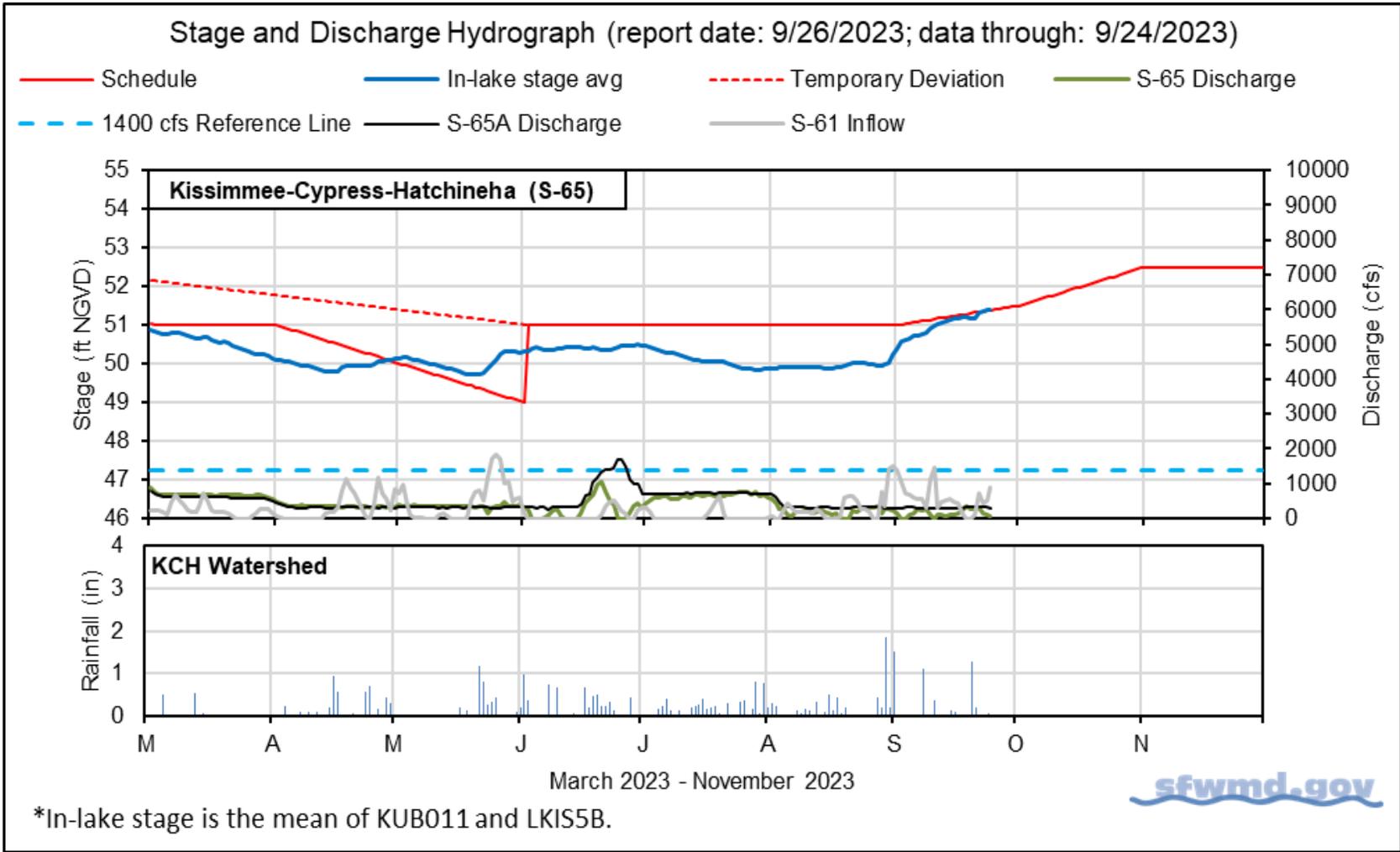


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

Table KB-2. One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations, and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Sunday Daily Average	Weekly Average for Previous Seven Day Periods			
		9/24/23	9/24/23	9/17/23	9/10/23	9/3/23
Discharge	S-65	57	220	120	160	160
Discharge	S-65A ^a	310	310	300	310	310
Headwater Stage (feet NGVD)	S-65A	46.1	46.2	46.1	46.4	45.9
Discharge	S-65D ^b	1,100	750	440	410	410
Headwater Stage (feet NGVD)	S-65D ^c	27.9	27.8	27.8	27.9	27.7
Discharge (cfs)	S-65E ^d	1,100	830	510	530	570
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	4.7	4.6	4.8	6.5	5.6
River channel mean stage ^f	Phase I river channel	34.5	34.0	33.1	33.1	33.0
Mean depth (feet) ^g	Phase I floodplain	0.30	0.26	0.18	0.16	0.16

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

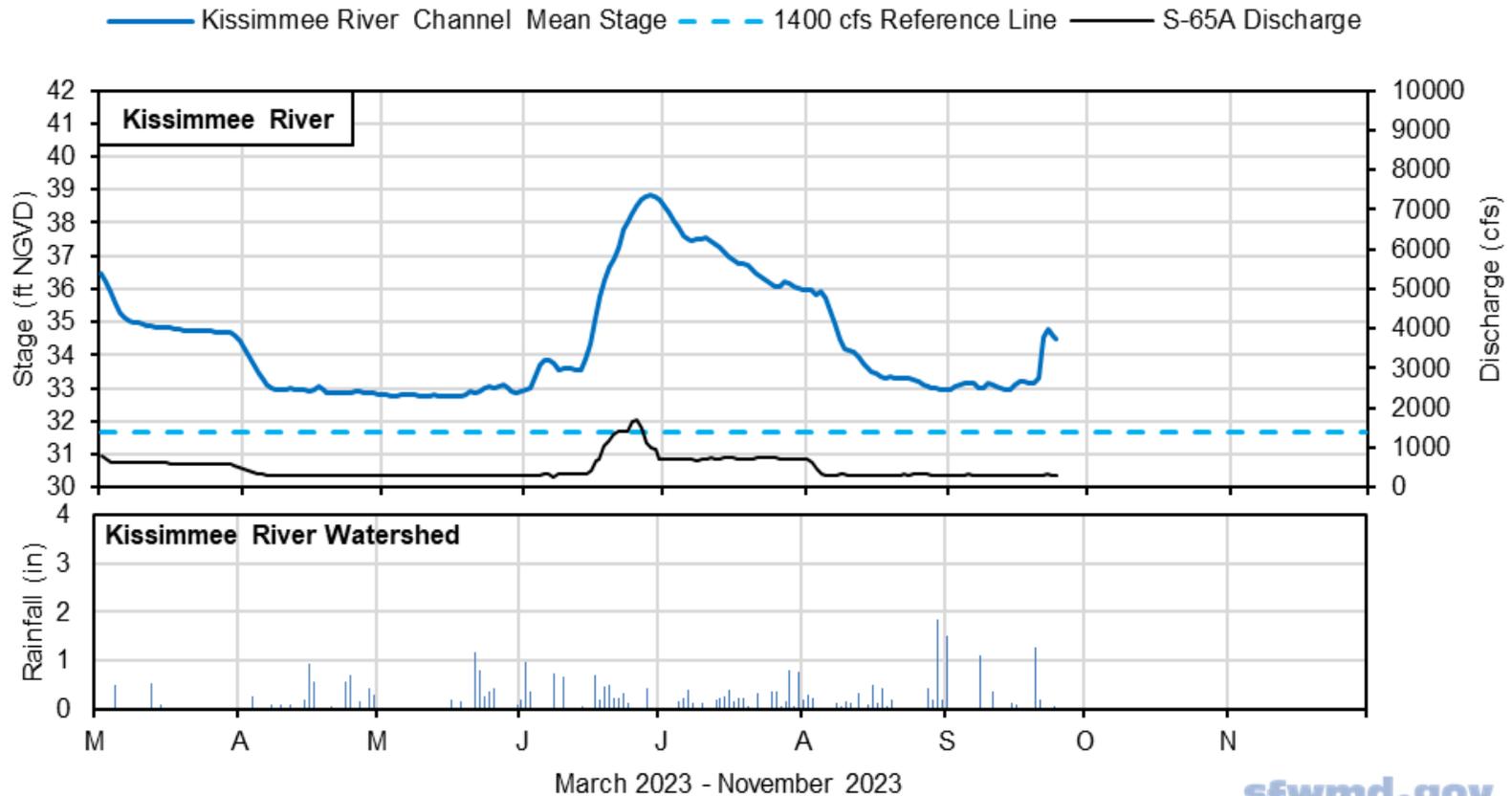
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

f. Mean of five river channel stations (PC62, KRDR02, KRBN, PC33, PC11) in the Phase I area.

g. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).

Stage and Discharge Hydrograph (report date: 9/26/2023; data through: 9/24/2023)



*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.



Figure KB-4. Kissimmee River stage, discharge, and rainfall.

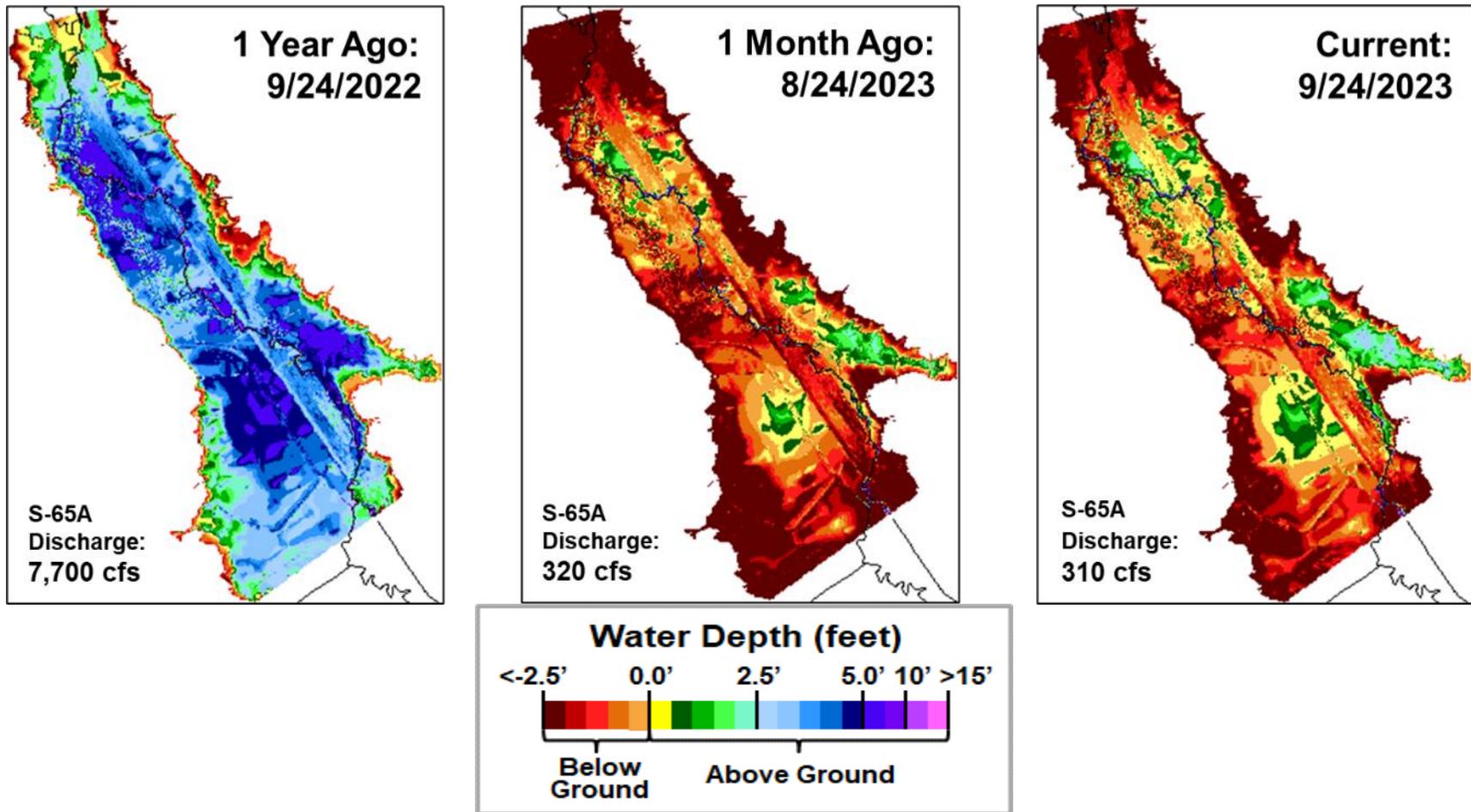
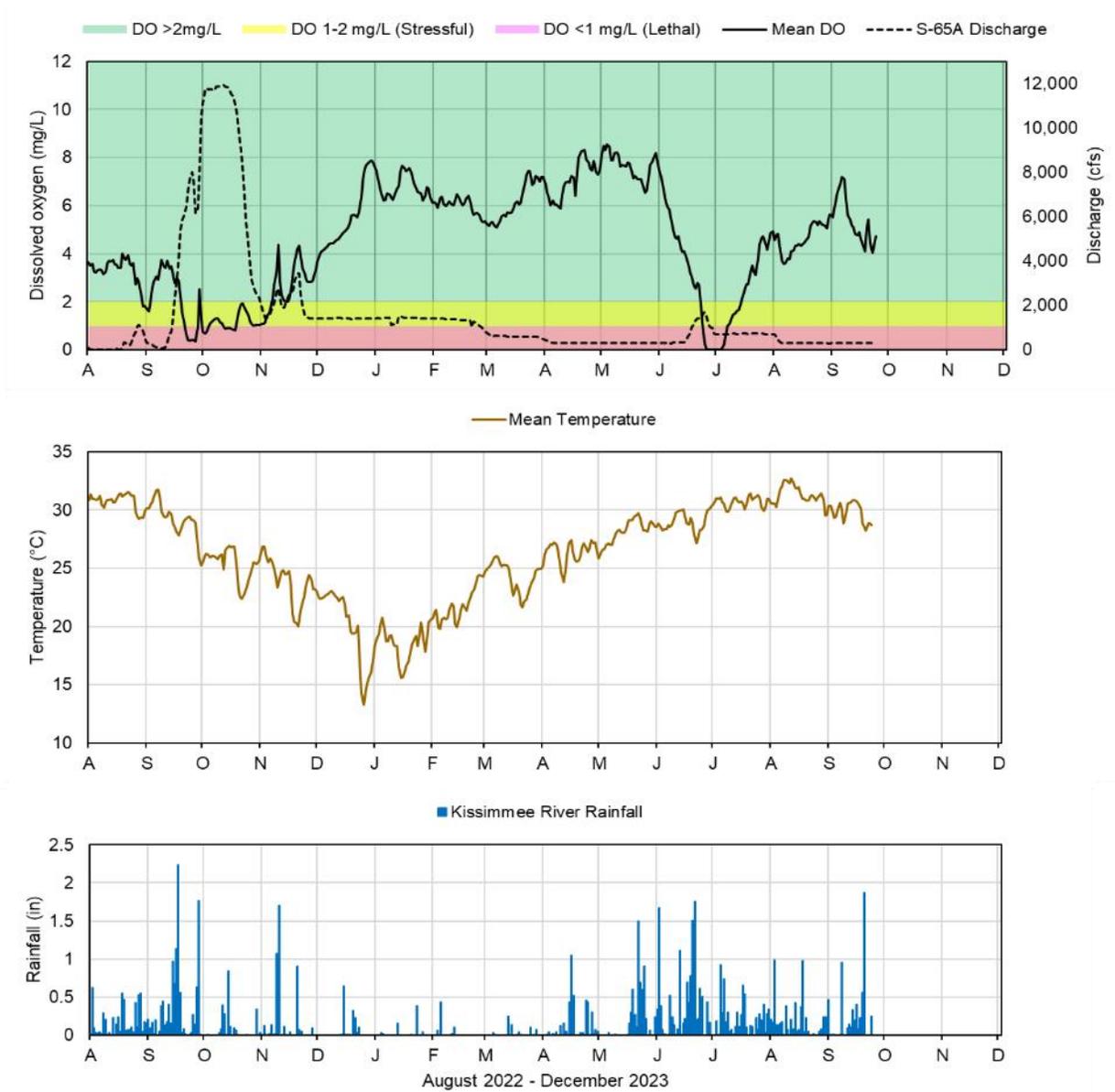


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago, and current.



Report Date: 9/26/2023; data are through: 9/24/2023



Figure KB-6. Restored Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C), and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of five stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

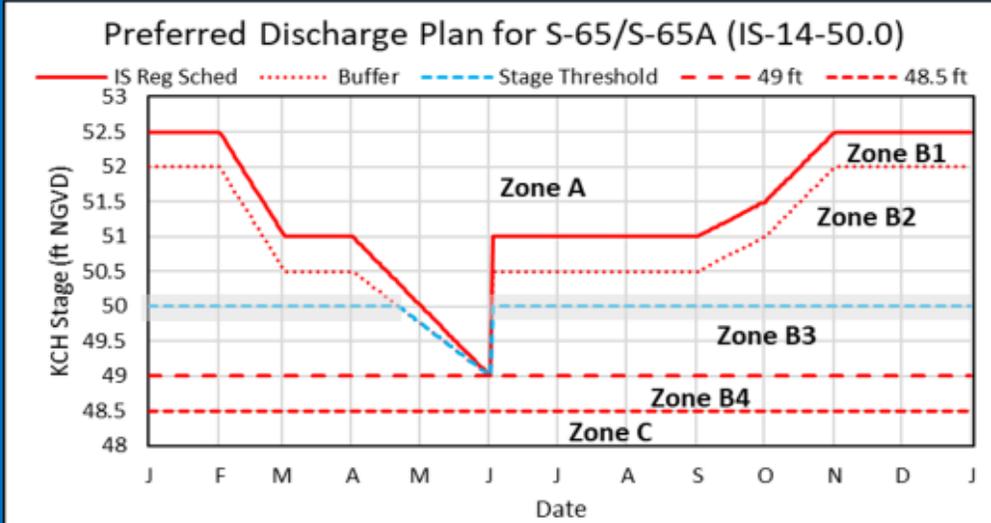
Stage and Discharge Guidance for 2021-2023.

Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line.
B2	Between the Flood Control Buffer and the 50.0 ft line.	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use ± 0.2 ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.
B3	Between the 50.0 ft line and 49 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 48.5 ft to 49 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft.
C	Below 48.5 ft.	0 cfs.

*Changes in discharge should not exceed limits in inset table below.

Q (cfs)	Maximum rate of INCREASE (cfs/day)	Maximum rate of DECREASE (cfs/day)
0-300	100	-50
301-650	150	-75
651-1400	300	-150
1401-3000	600	-600
>3000	1000	-2000

2021-2023 Discharge Plan for S-65/S-65A



- Other Considerations**
- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.25 ft per 7 days in Lakes Kissimmee, Cypress, Hatchineha (S-65), East Toho (S-59) and Toho (S-61).
 - If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

Slide Revised 1/3/2022

Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 15.47 feet NGVD on September 24, 2023, which was 0.06 feet higher than the previous week and 0.12 feet higher than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 0.32 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 1.33 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 2,130 cfs to 3,410 cfs. The highest structure inflow came from the C-41A Canal via the S-84/84X structure (1,180 cfs). Average daily outflows (excluding rainfall) decreased from the previous week, going from 1,460 cfs to 350 cfs. The highest average single structure outflow was recorded at the S-77 structure into the C-43 Canal (290 cfs). **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The cyanobacteria index level was low to moderate in the western region of the Lake according to the September 22, 2023, satellite image from NOAA's Harmful Algal Bloom Monitoring System (**Figure LO-6**). Routine phytoplankton monitoring on September 18 - 20 did not detect microcystins at any sampling stations. A low concentration of anatoxin-a (0.34 µg/L) was detected at the POLESOUT station in the northwestern part of the Lake (**Figure LO-7**). Phytoplankton communities were dominated by *Microcystis aeruginosa* at 7 stations and *Planktolyngbya limnetica* at 5 stations, and the remaining 20 stations had mixed communities. All data presented in this report are provisional and are subject to change.

Changes in Water Depth

1 Month Ago:
08/24/2023

Current:
09/24/2023

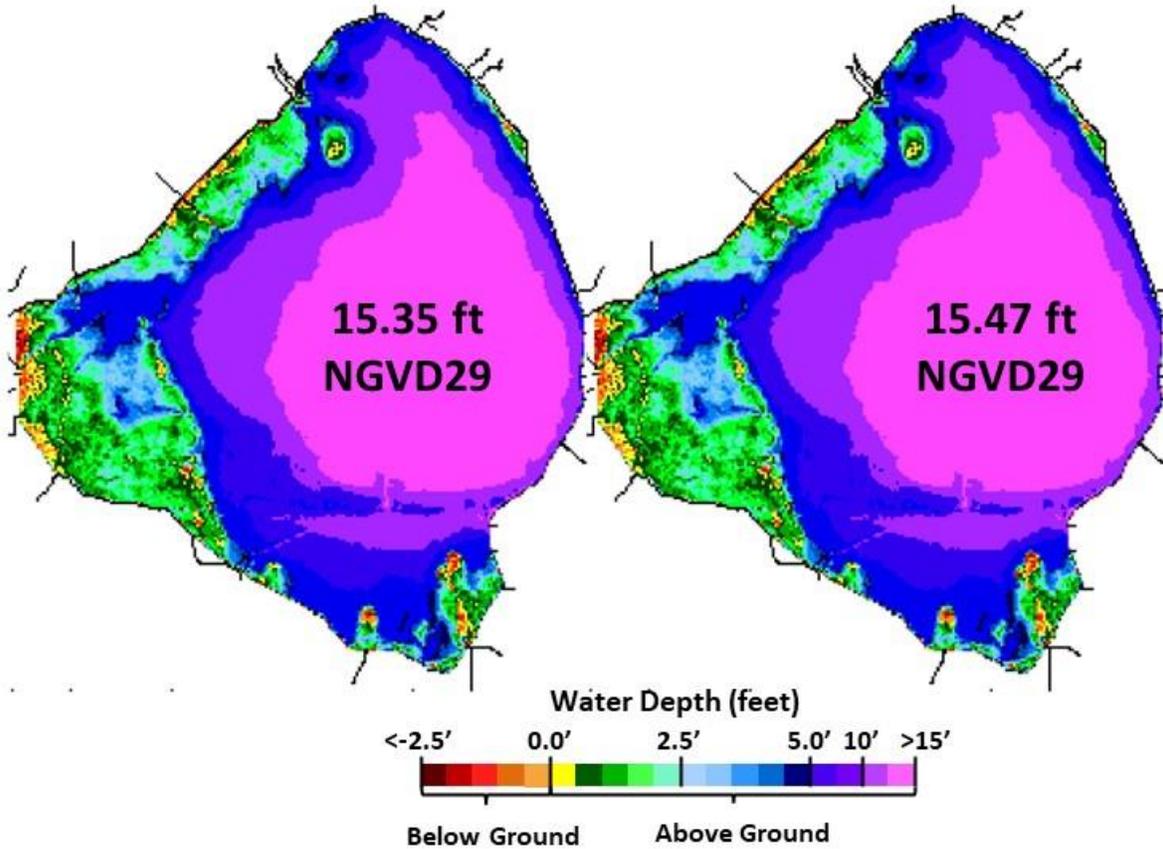


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

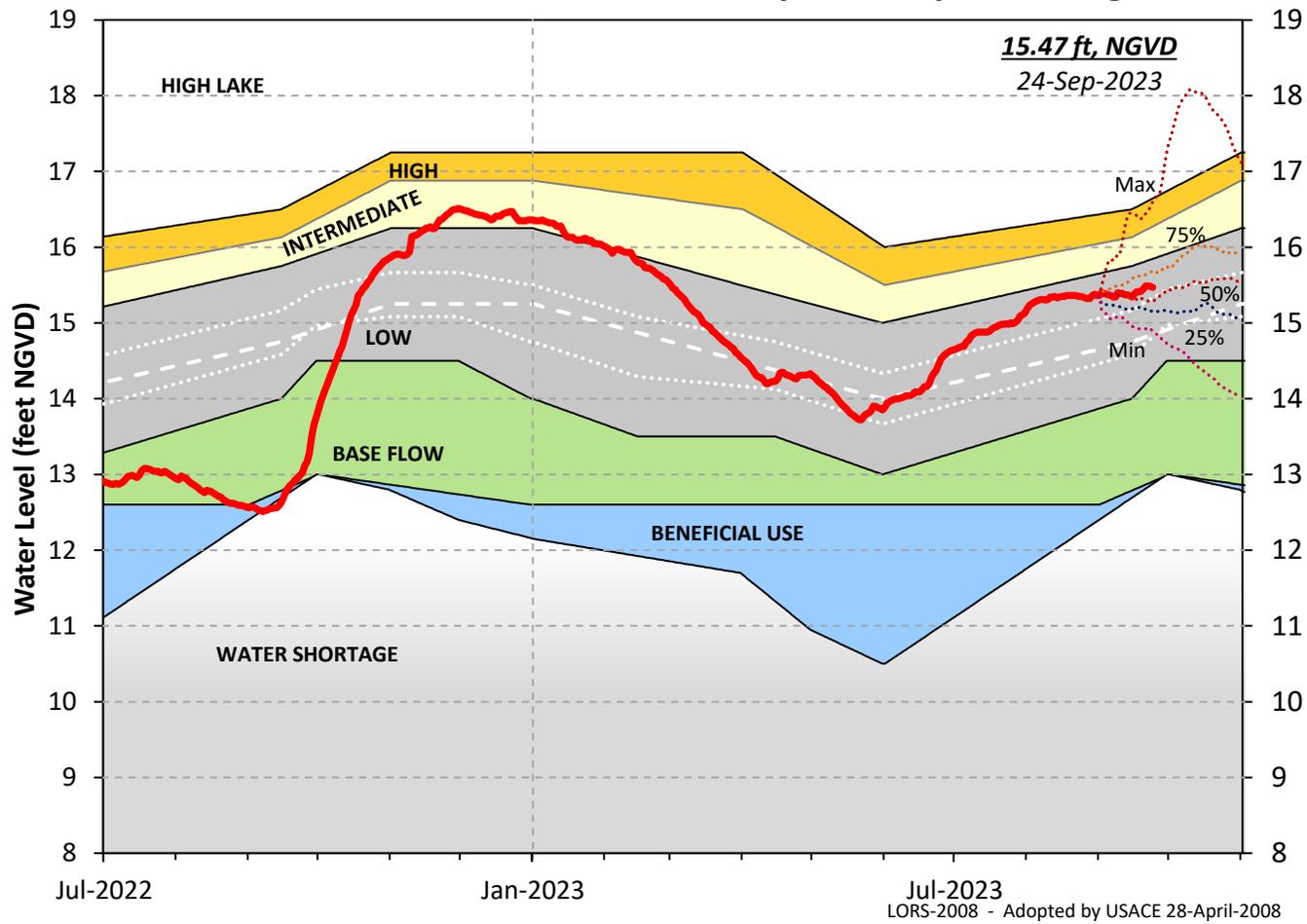


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

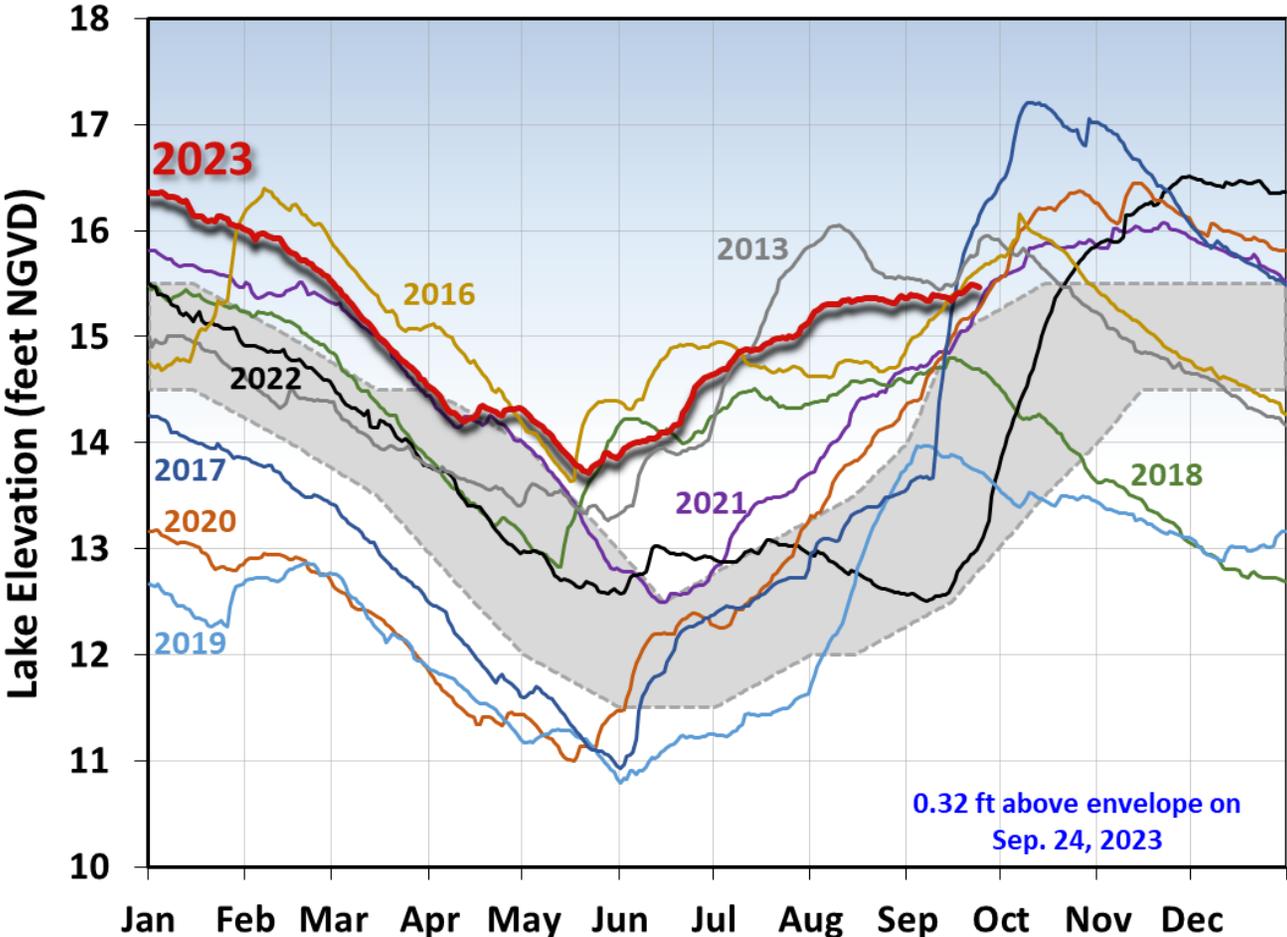


Figure LO-3. The prior eight years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

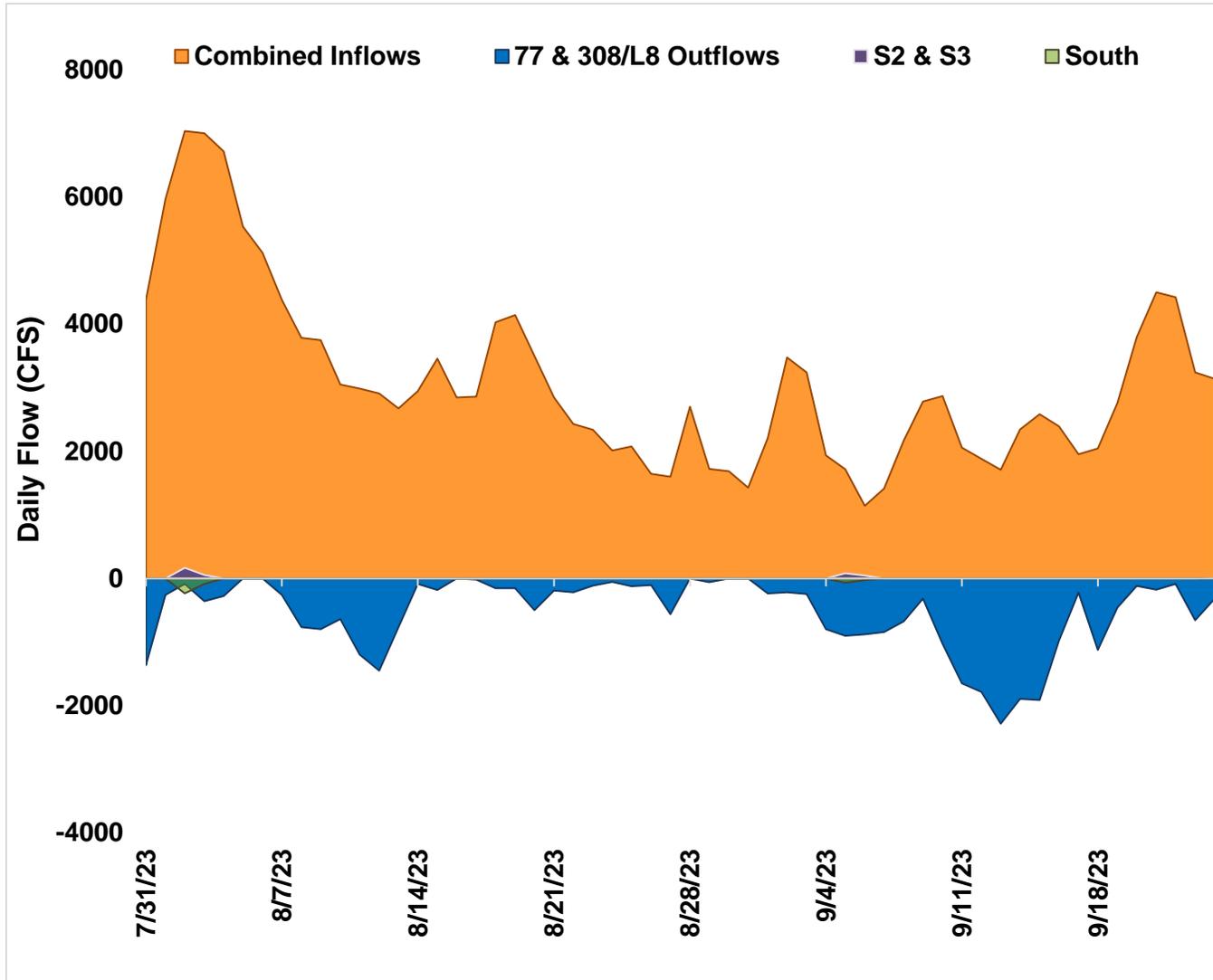


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.

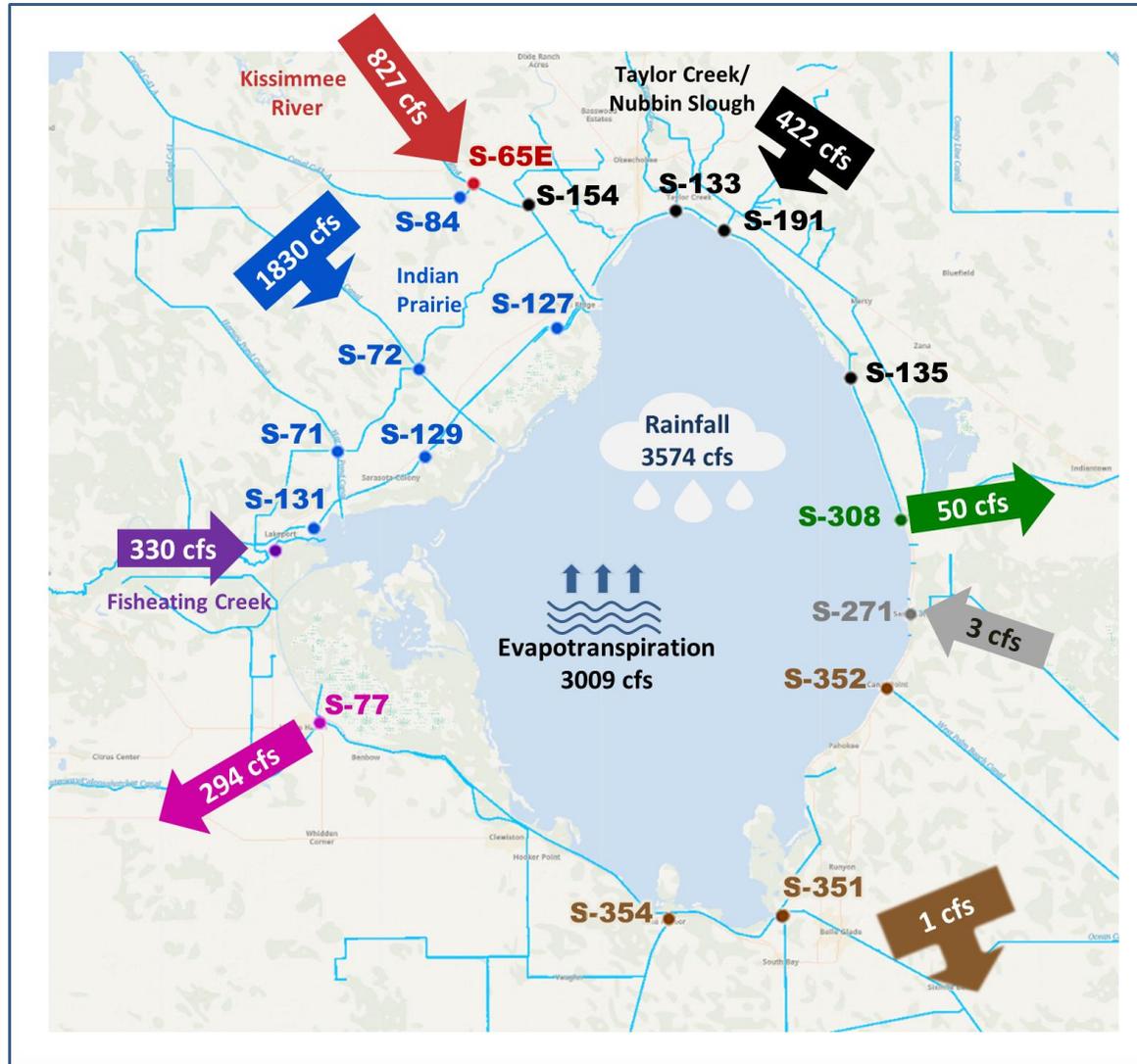


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of September 18 - 24, 2023.

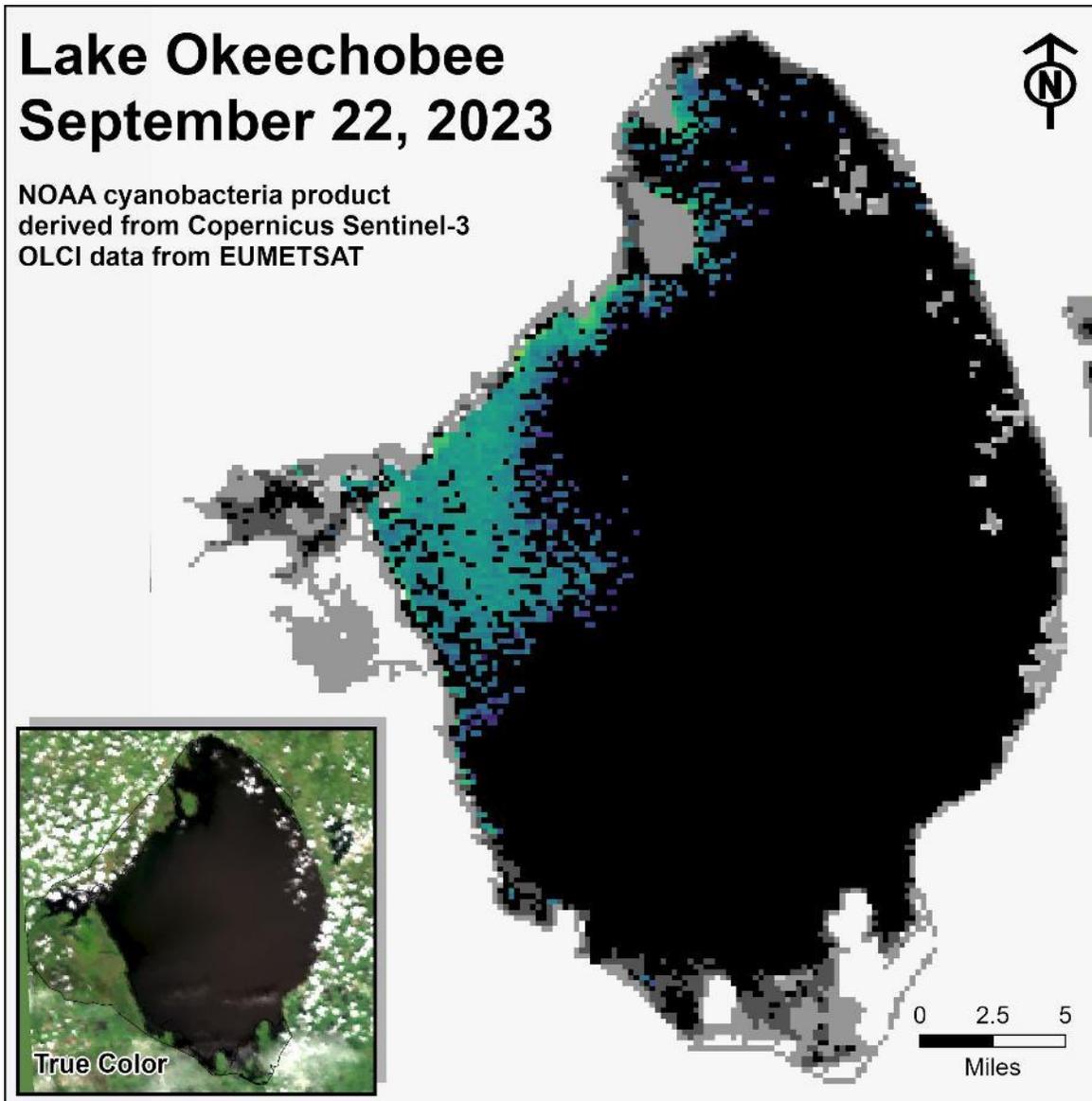


Figure LO-6. Cyanobacteria bloom index level on September 22, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

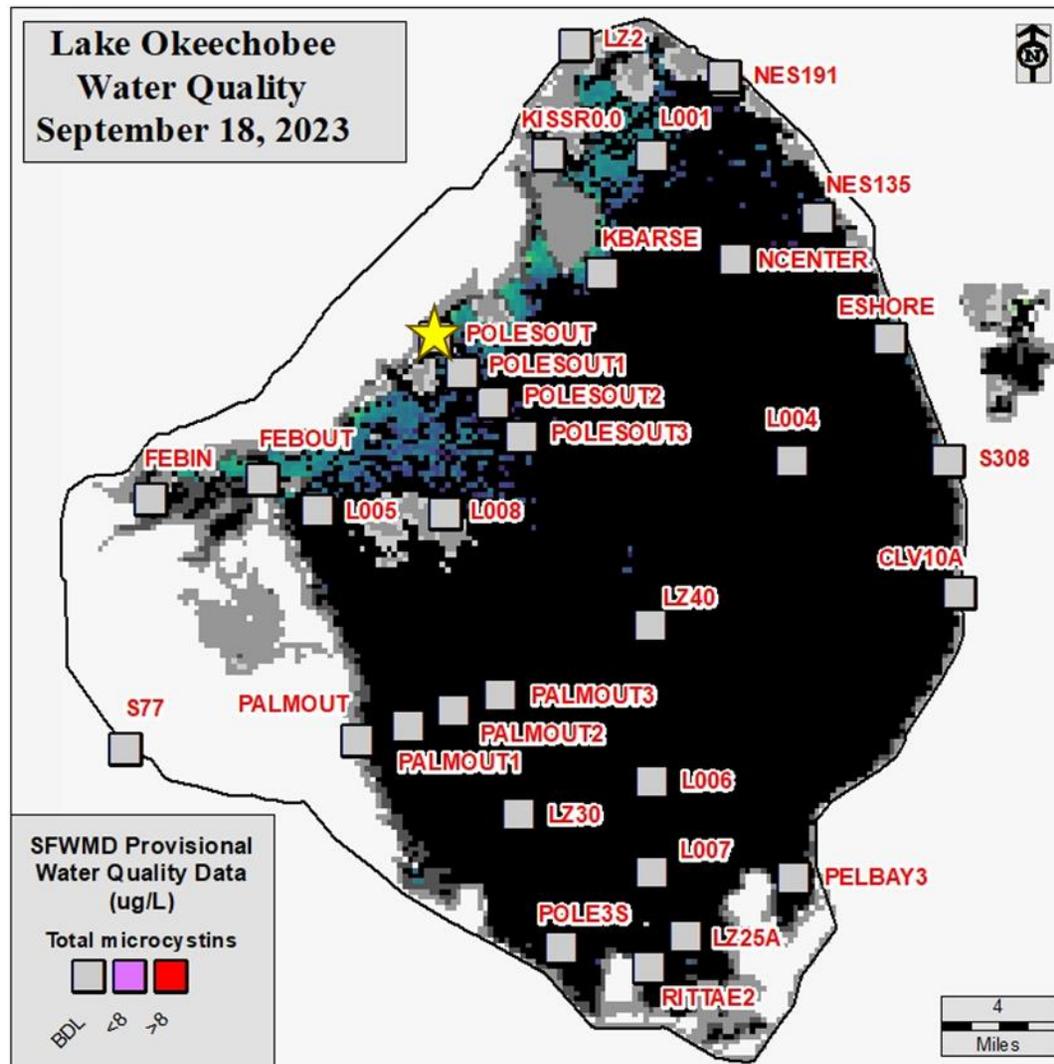


Figure LO-7. Total microcystins ($\mu\text{g/L}$) data from September 18 - 20, 2023. Sampling locations are overlaid on the September 18, 2023 image from NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover. Yellow star at the POLESOUT station indicates presence of anatoxin-a neurotoxins in the water.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 860 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 650 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at US1 and A1A Bridge sites, and the HR1 site was not functioning properly and will be undergoing maintenance this week (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 17.3. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 1.1 spat/shell for September, which was a decrease from August (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,540 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 2,740 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities decreased at all sites within the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and Shell Point and in the stressed range at Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by FWRI was 4.7 spat/shell at Iona Cove in September, which was a slight decrease from the previous month. At Bird Island, the reported rate was 29.1 spat/shell for September, which was an increase from August (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecast for the next two weeks using an autoregression model (Qiu and Wan, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 1,461 cfs. Model results from all scenarios predict daily salinity to be 0.8 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

¹ Qui, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

Red Tide

The FWRI reported on September 22, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from Palm Beach or Miami-Dade counties.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are near normal. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

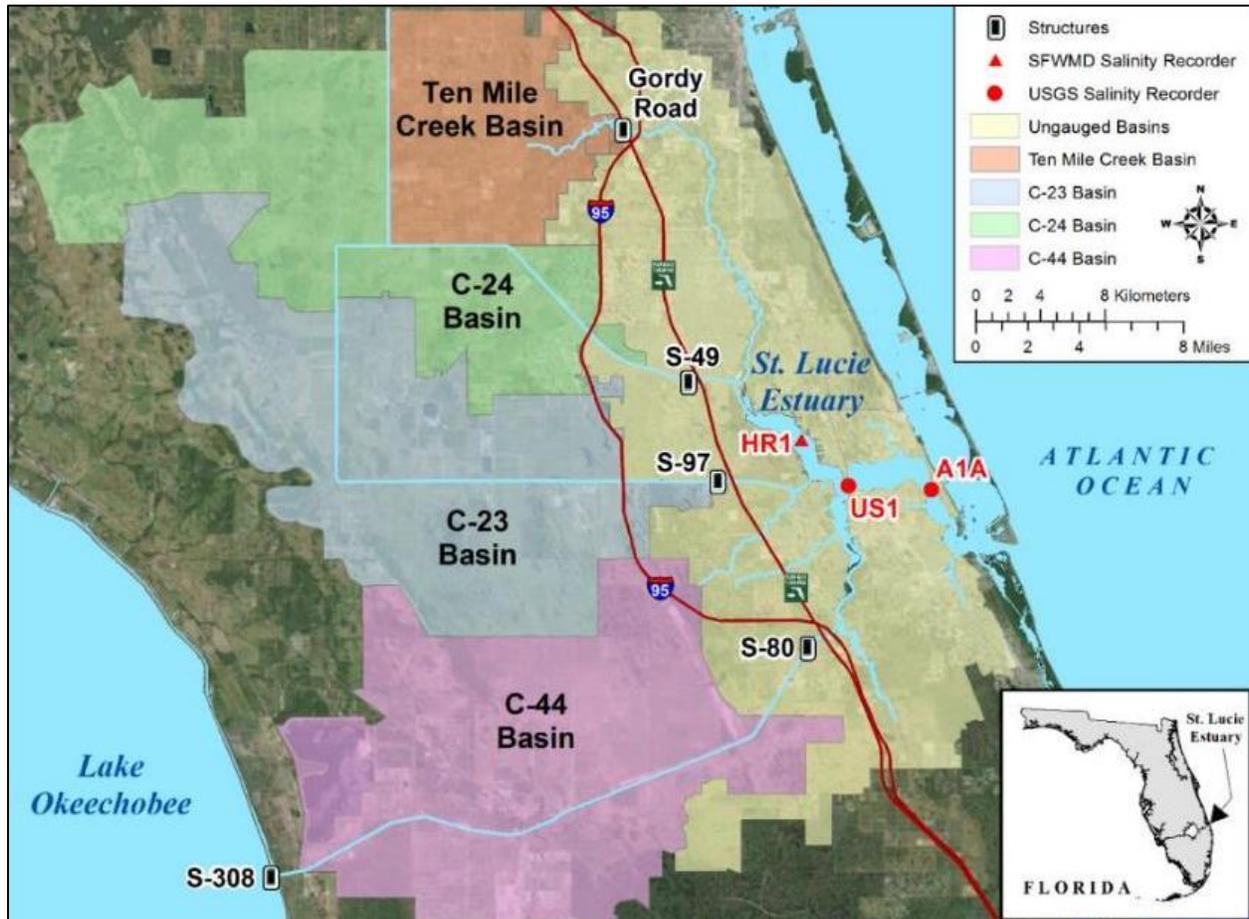


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

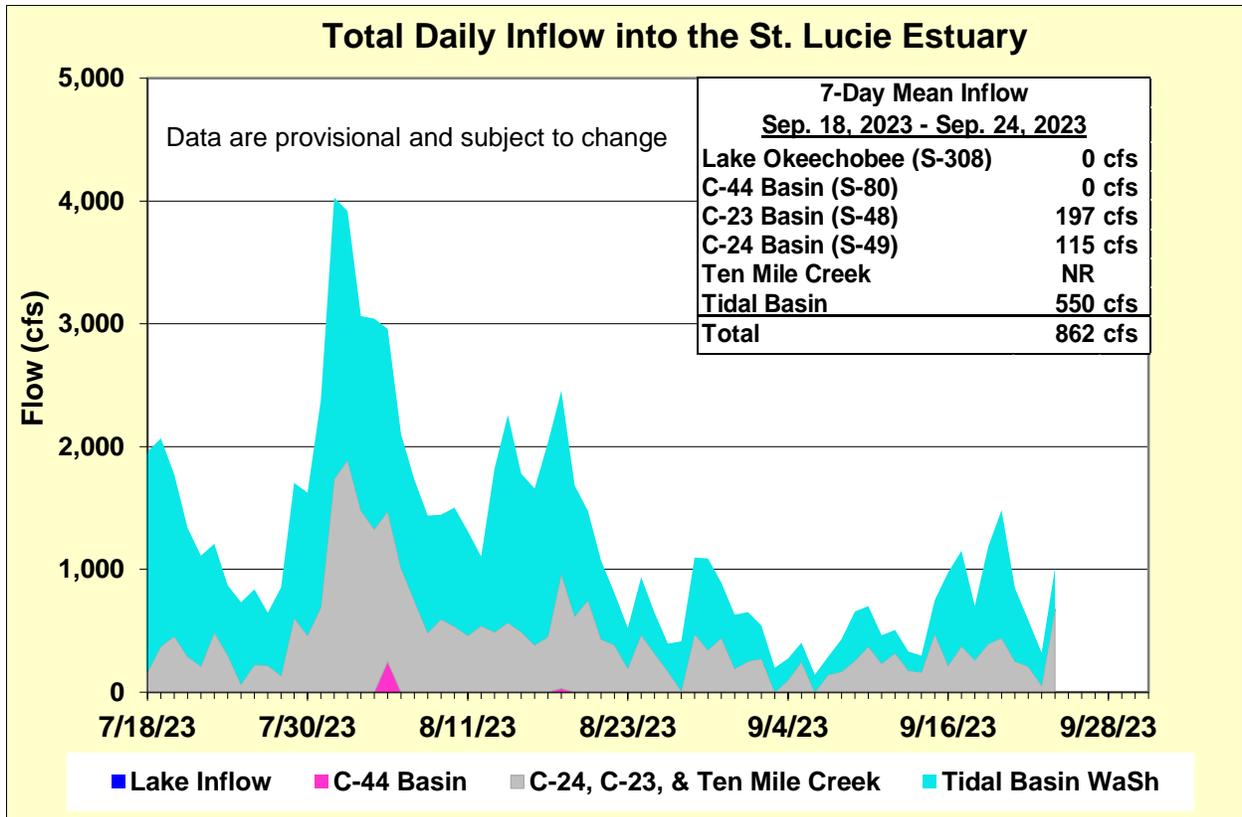


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

Table ES-1. Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	- (9.0)	- (15.4)	10.0 – 25.0
US1 Bridge	16.0 (16.1)	18.6 (18.9)	10.0 – 25.0
A1A Bridge	24.0 (24.4)	28.0 (28.4)	10.0 – 25.0

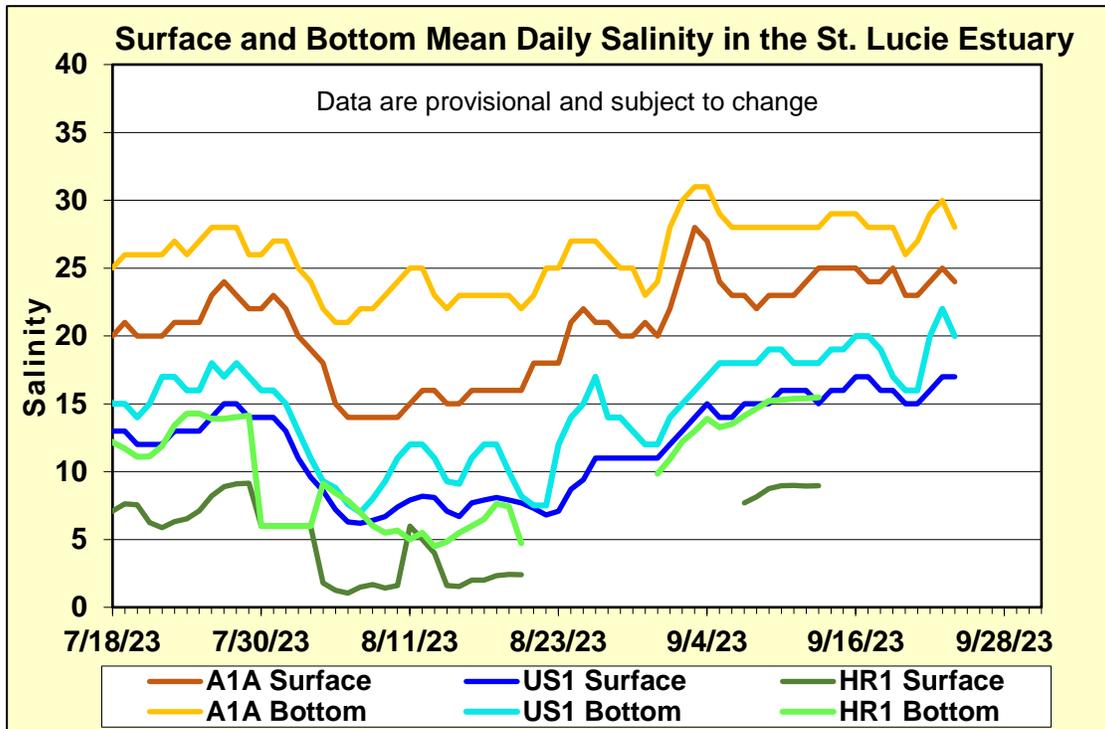


Figure ES-3. Mean daily salinity at the A1A, US1, and HR1 sites in the St. Lucie Estuary.

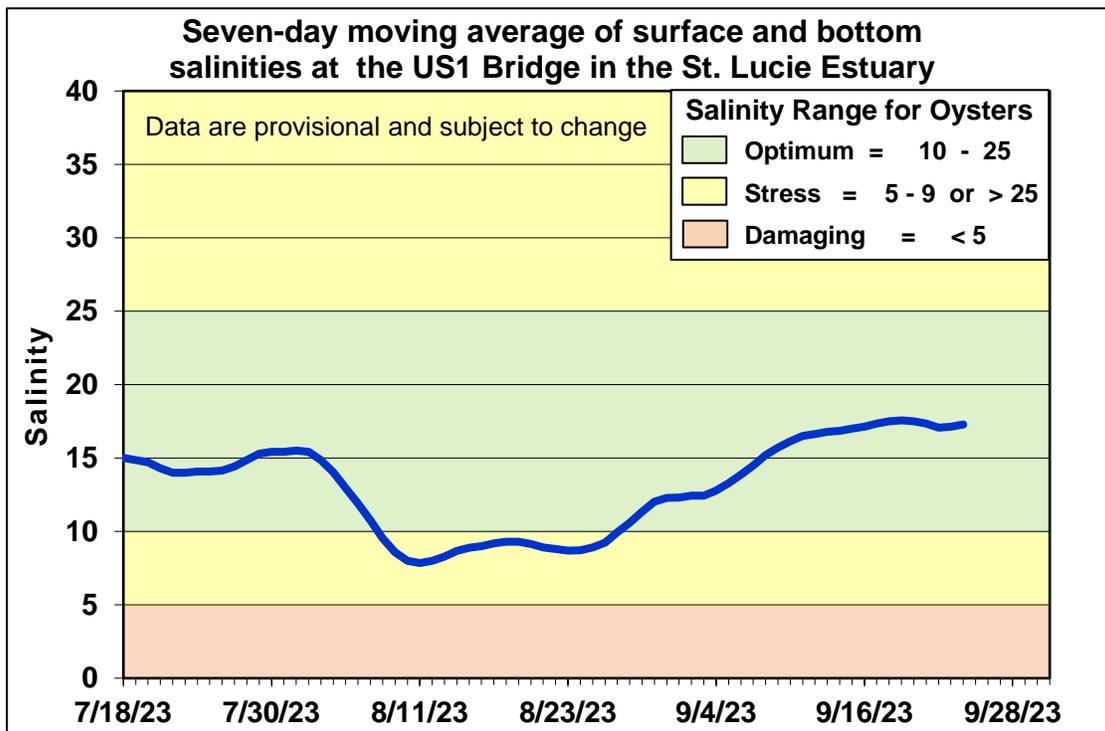


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

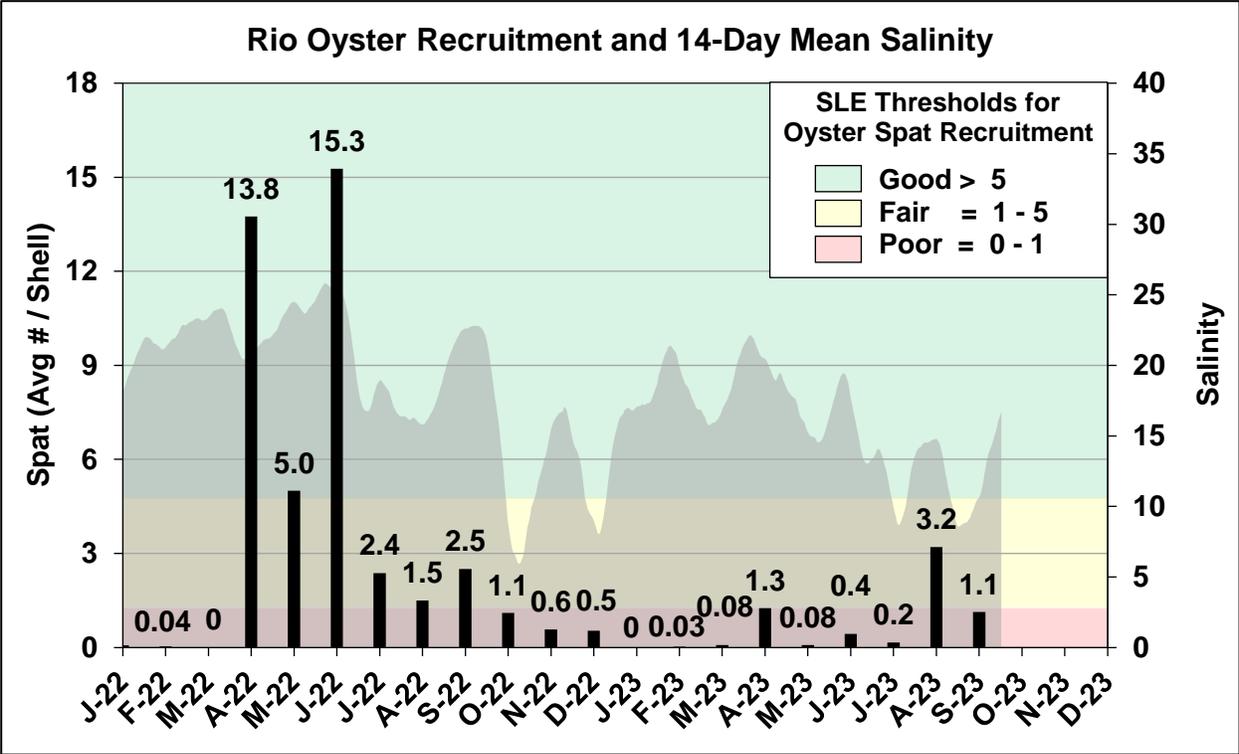


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

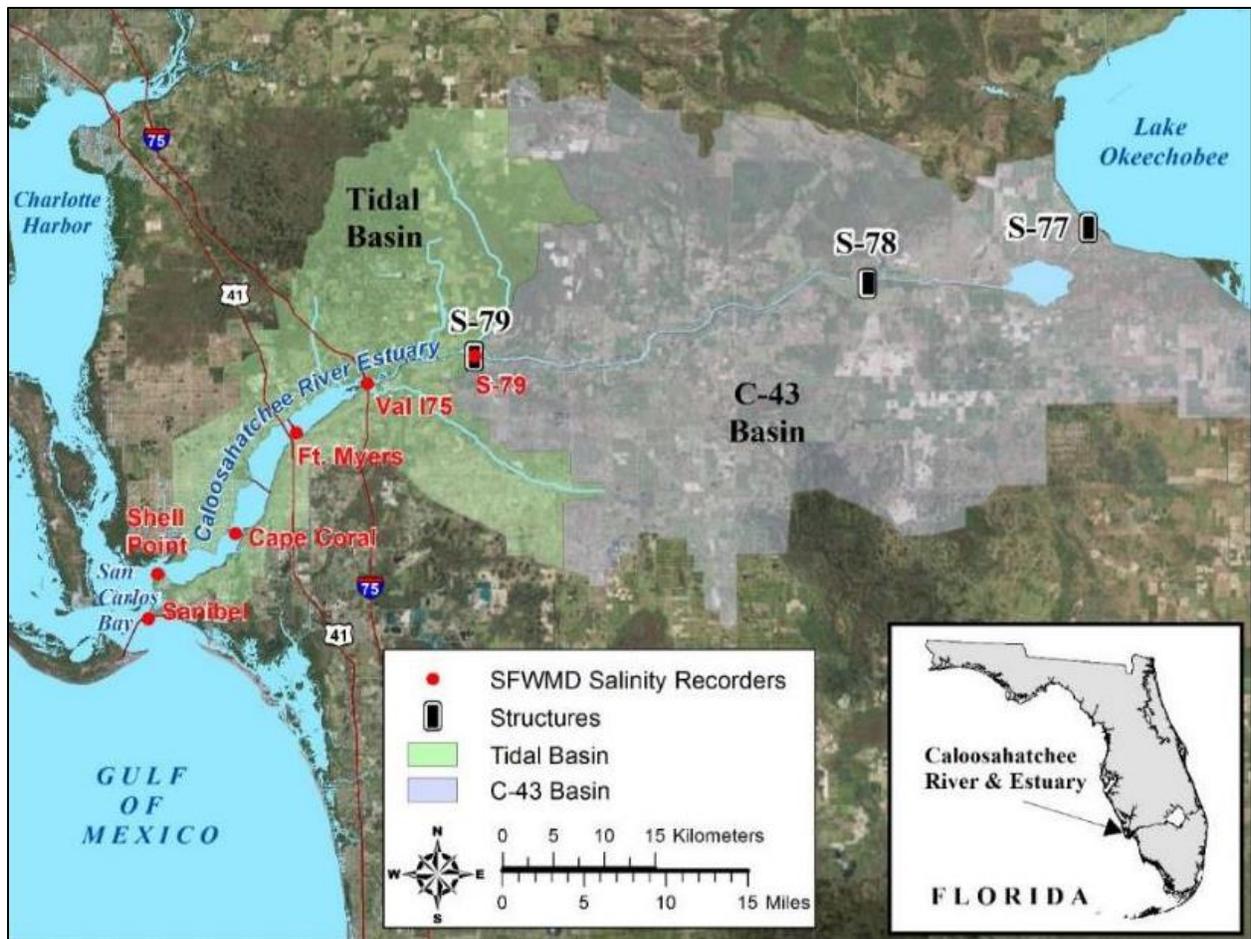


Figure ES-6. Basins, water control structures, and salinity monitoring sites in the Caloosahatchee River Estuary.

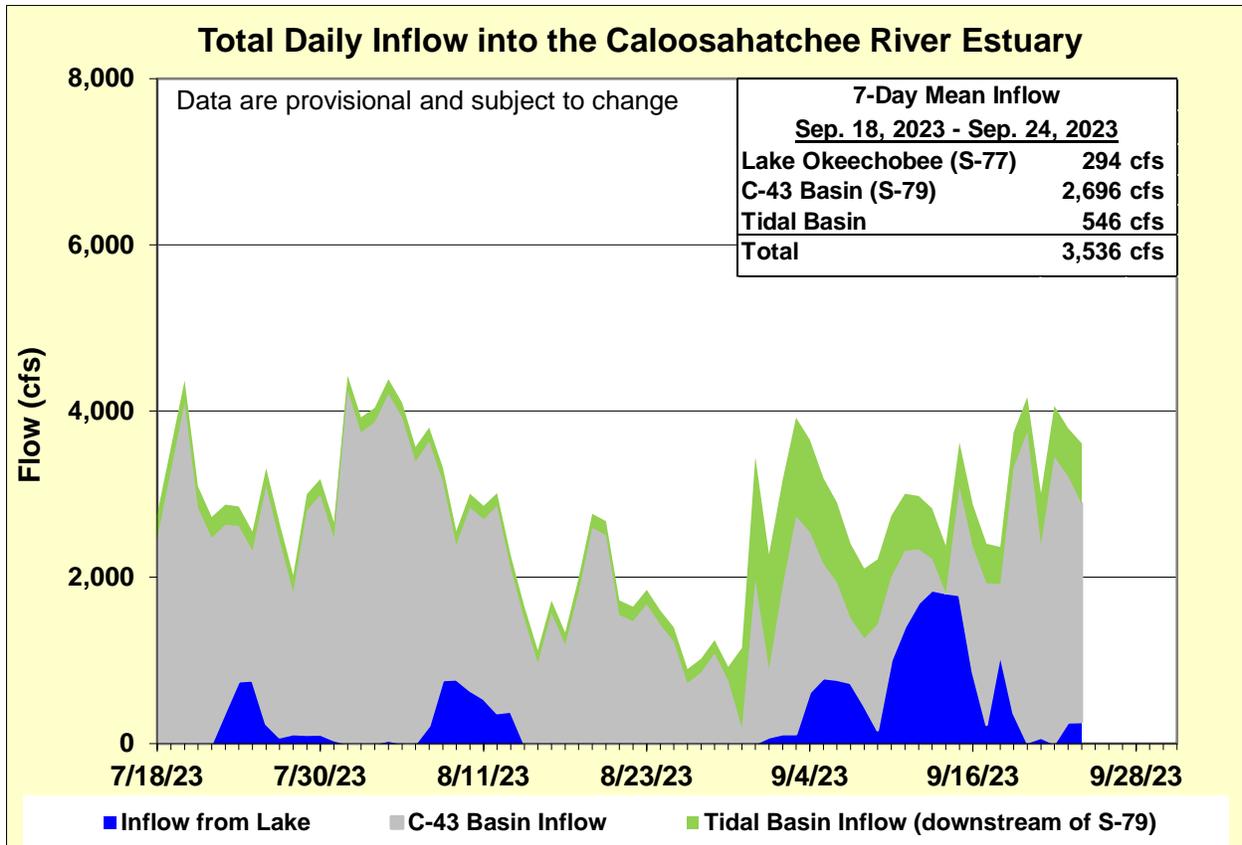


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	0.2 (0.4)	0.2 (0.4)	0.0 – 10.0
Val I-75	1.9 (2.3)	1.9 (2.7)	0.0 – 10.0
Fort Myers Yacht Basin	3.5 (6.1)	4.7 (6.7)	0.0 – 10.0
Cape Coral	9.3 (11.5)	10.7 (12.3)	10.0 – 25.0
Shell Point	23.4 (25.9)	24.6 (26.3)	10.0 – 25.0
Sanibel	32.5 (33.1)	31.7 (32.1)	10.0 – 25.0

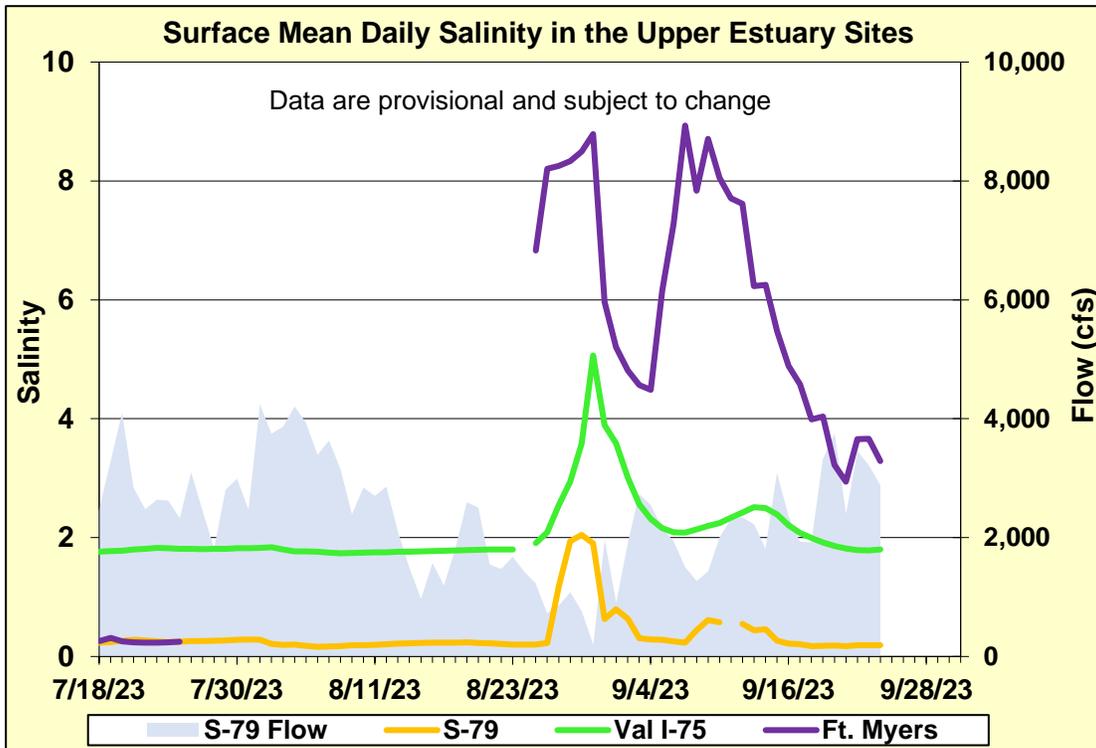


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

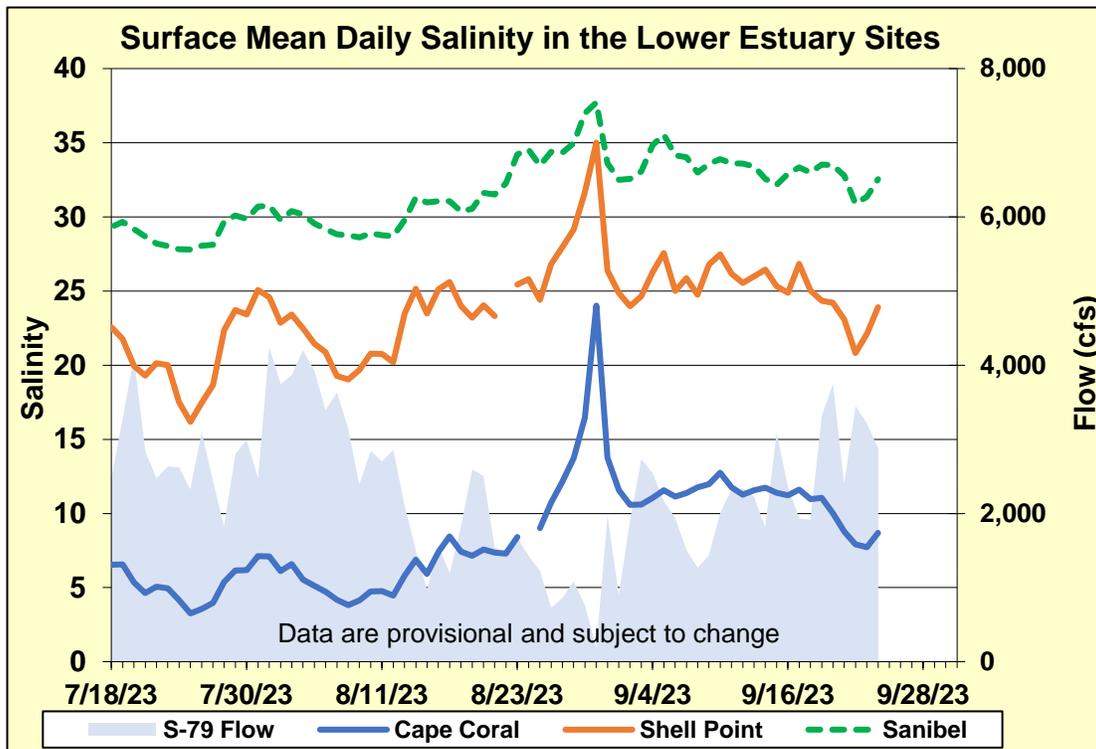


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

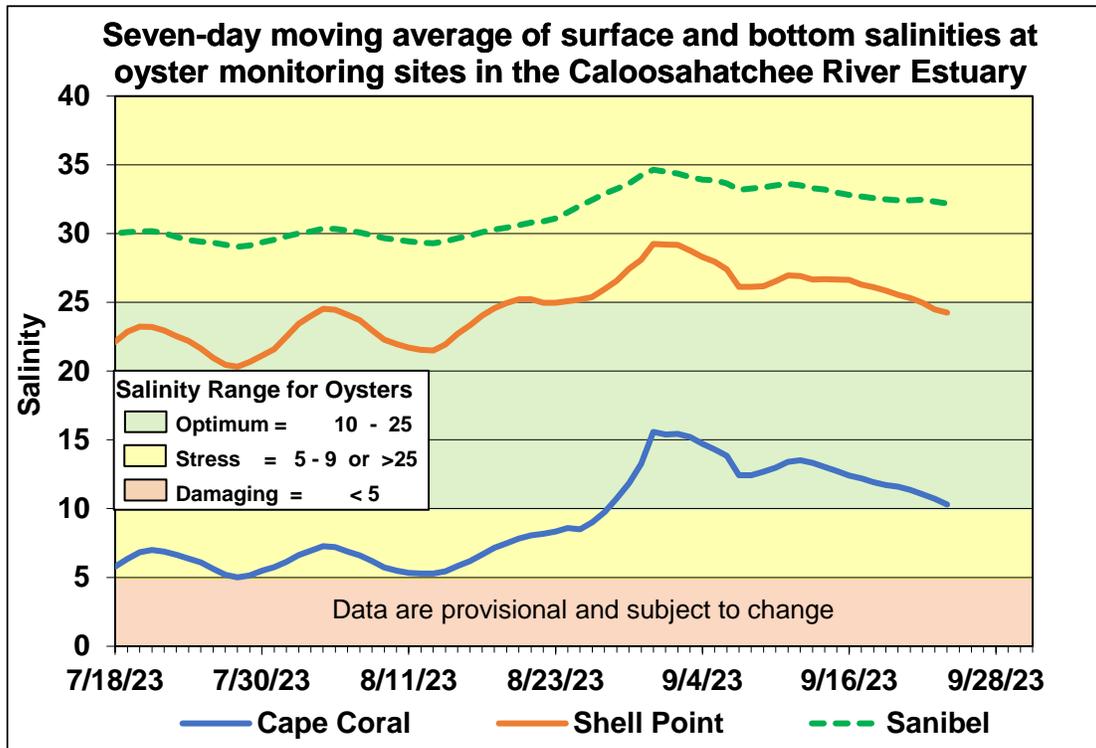


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point, and Sanibel monitoring sites in the Caloosahatchee River Estuary.

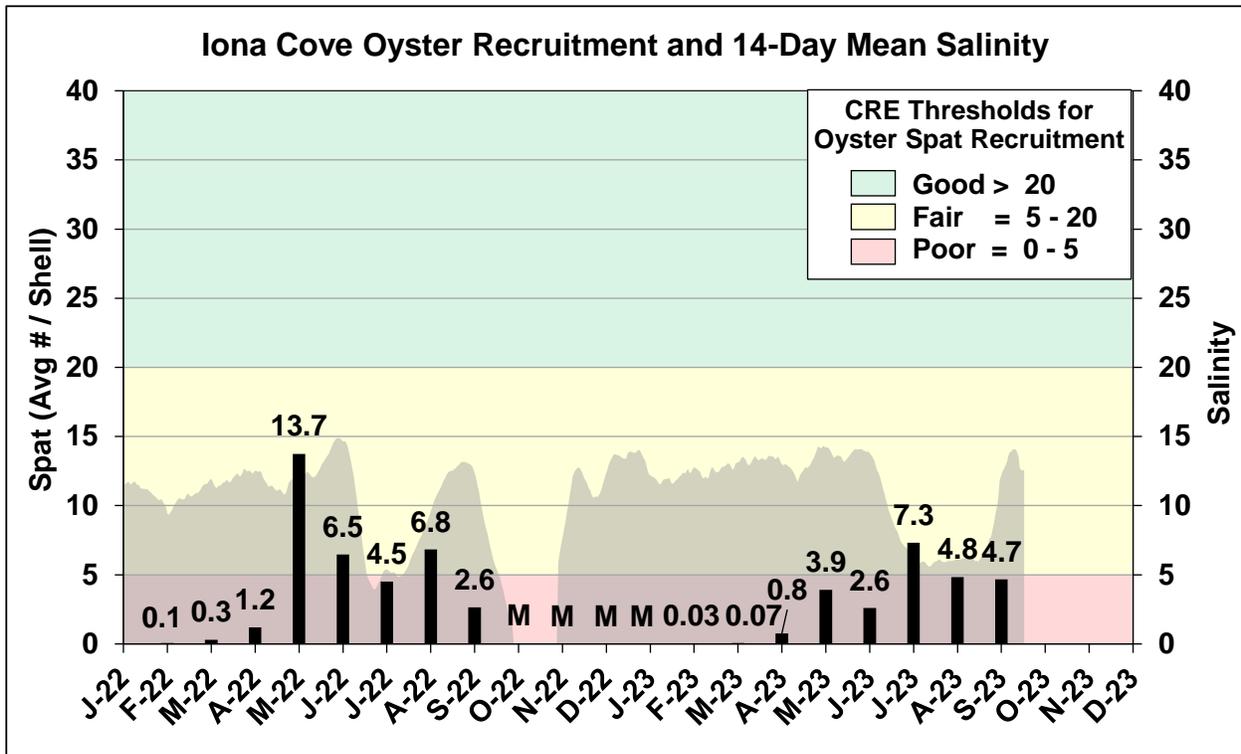


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

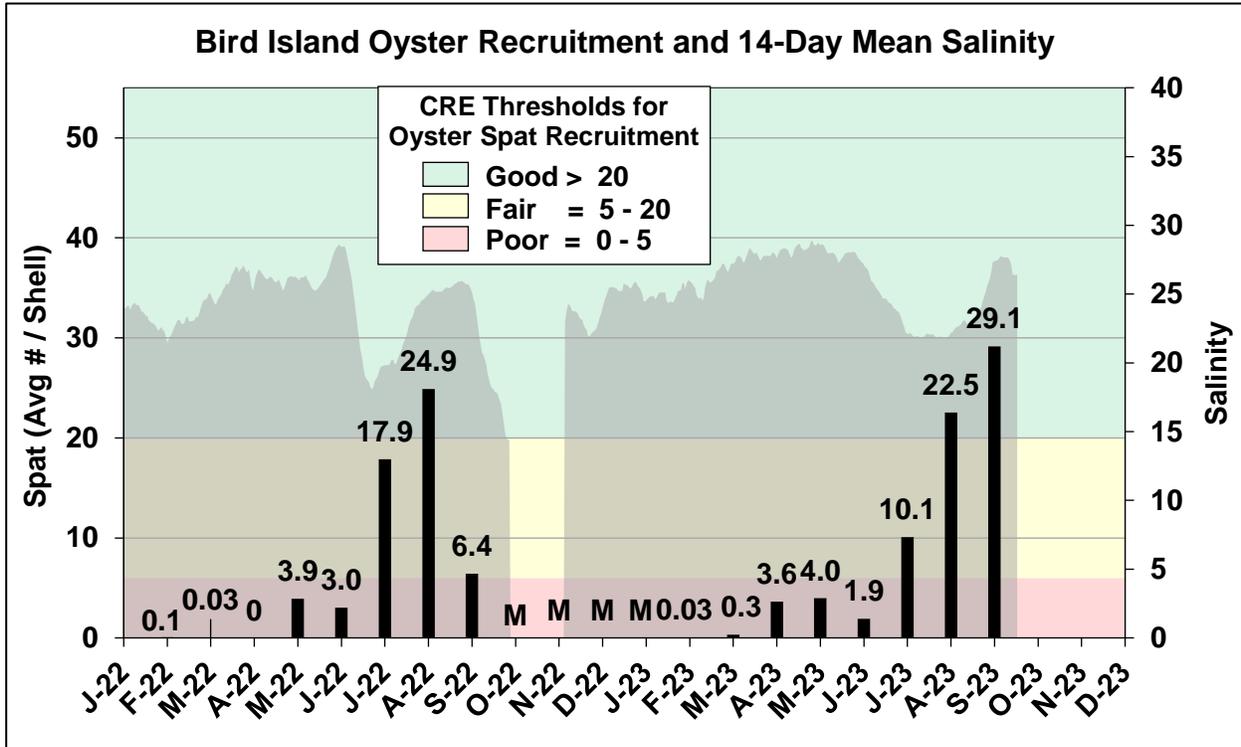


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	1461	0.8	0.5
B	450	1461	0.3	0.4
C	750	1461	0.3	0.4
D	1,000	1461	0.3	0.4
E	1,500	1461	0.3	0.4
F	2,000	1461	0.3	0.4

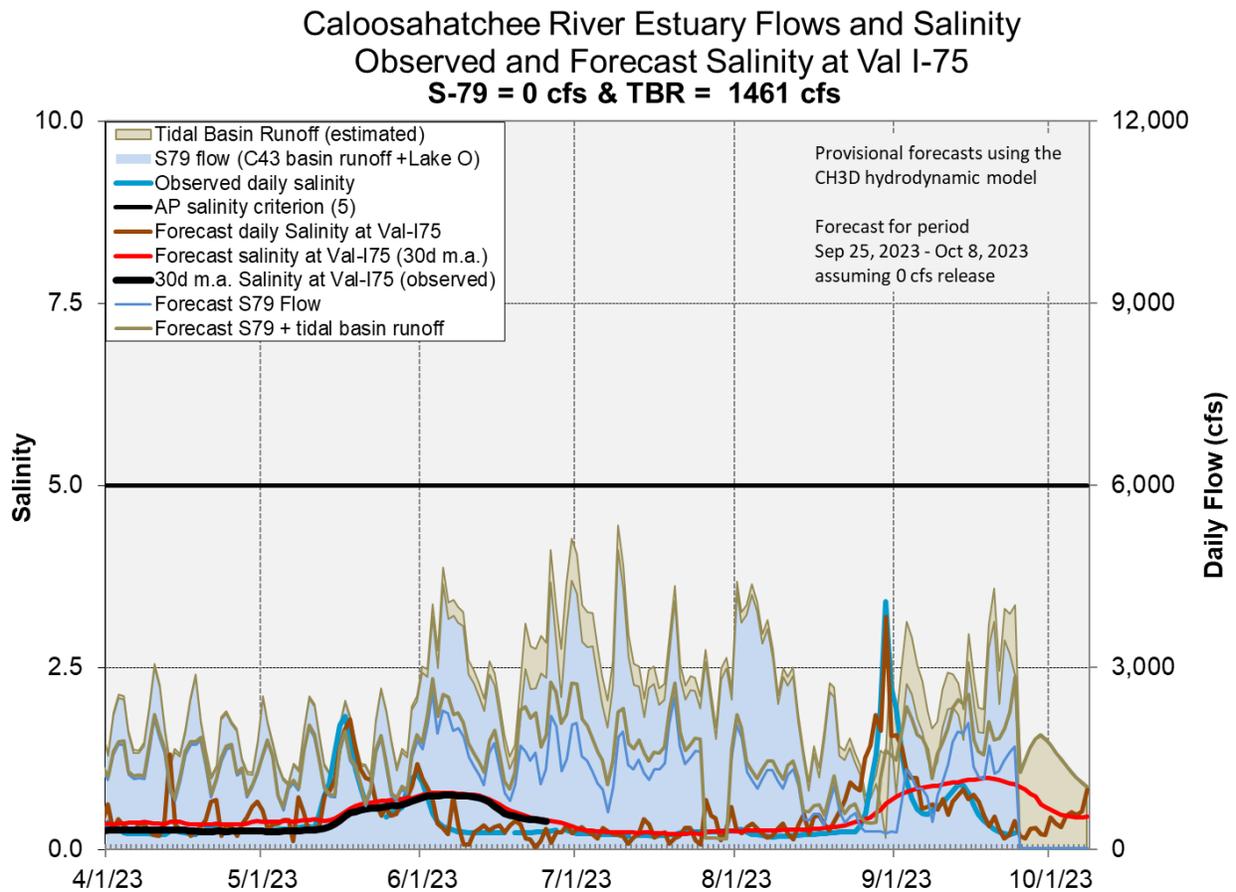


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in. Online treatment cells are at or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rate (PLRs) for the Central Flow-way and Eastern Flow-ways are high (**Figure S-1**).

STA-1W: An operational restriction is in place in STA-1W Northern Flow-way for vegetation management activities. Treatment cells are above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Eastern and Western Flow-ways are high, and the 365-day PLR for the Northern Flow-ways is below 1.0 g/m²/year (**Figure S-1**).

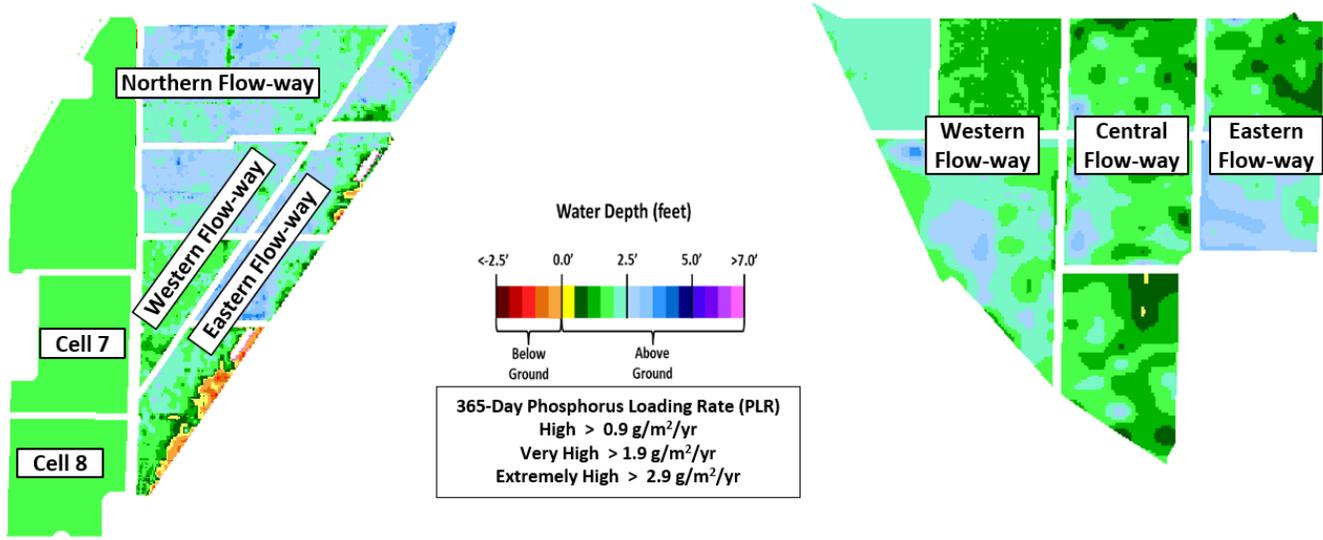
STA-2: Operational restrictions are in place in Flow-ways 2 and 4 for vegetation management activities, and in STA-2 Flow-way 3 for canal plug refurbishments. Most online treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 3, 4, and 5 are below 1.0 g/m²/year. The 365-day PLR for Flow-way 1 is high (**Figure S-2**).

STA-3/4: An operational restriction is in place in the Eastern Flow-way for post-drawdown vegetation grow-in. Online treatment cells are above target stage. Vegetation in the Central Flow-way is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m²/year (**Figure S-2**).

STA-5/6: An operational restriction is in place in Flow-way 4 for vegetation management (prescribed burn). Most treatment cells are at or above target stage. All treatment cells have highly stressed or stressed vegetation conditions except Flow-way 7 which is healthy. The 365-day PLRs for Flow-ways 1, 4, 6, 7, and 8 are below 1.0 g/m²/year, the 365-day PLRs for Flow-ways 2 and 5 are high, and the 365-day PLR for Flow-way 3 is very high. (**Figure S-3**).

For definitions on STA operational language see glossary following figures.

Eastern Flow Path Weekly Status Report – 9/18/2023 through 9/24/2023

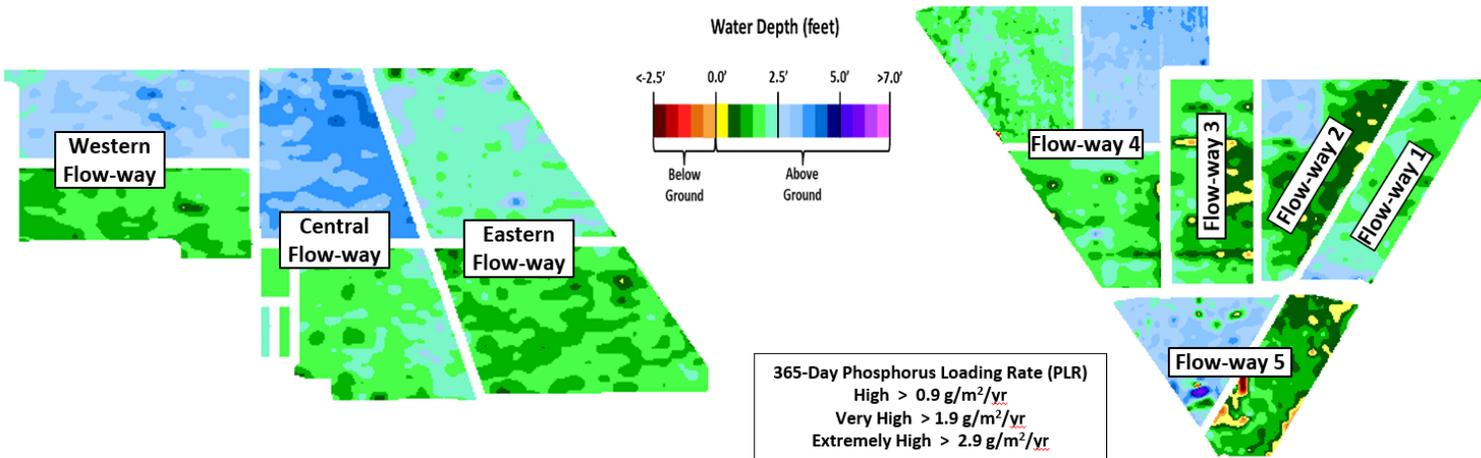


STA-1W	Flow-way Status
Western	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Northern	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions • Planting emergent vegetation
Cell 7	<ul style="list-style-type: none"> • Stressed vegetation conditions
Cell 8	<ul style="list-style-type: none"> • Construction activities

STA-1E	Flow-way Status
Western	<ul style="list-style-type: none"> • Offline for post-construction vegetation grow-in
Central	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> • High 365-day PLR • Stressed vegetation conditions

Figure S-1. Eastern Flow Path Weekly Status Report

Central Flow Path Weekly Status Report – 9/18/2023 through 9/24/2023



STA-3/4	Flow-way Status
Western	<ul style="list-style-type: none"> Stressed vegetation conditions Nuisance vegetation control within inflow canal
Central	<ul style="list-style-type: none"> Highly stressed vegetation conditions Removal of floating tussocks Nuisance vegetation control within inflow canal
Eastern	<ul style="list-style-type: none"> Post-drawdown vegetation grow-in Nuisance vegetation control within inflow canal

STA-2	Flow-way Status
Flow-way 1	<ul style="list-style-type: none"> High 365-day PLR Stressed vegetation conditions
Flow-way 2	<ul style="list-style-type: none"> Post-construction vegetation grow-in Planting emergent vegetation
Flow-way 3	<ul style="list-style-type: none"> Refurbishments project - plug construction Stressed vegetation conditions
Flow-way 4	<ul style="list-style-type: none"> Planting emergent vegetation Nuisance vegetation control Highly stressed vegetation conditions
Flow-way 5	<ul style="list-style-type: none"> Highly stressed vegetation conditions

Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 9/18/2023 through 9/24/2023

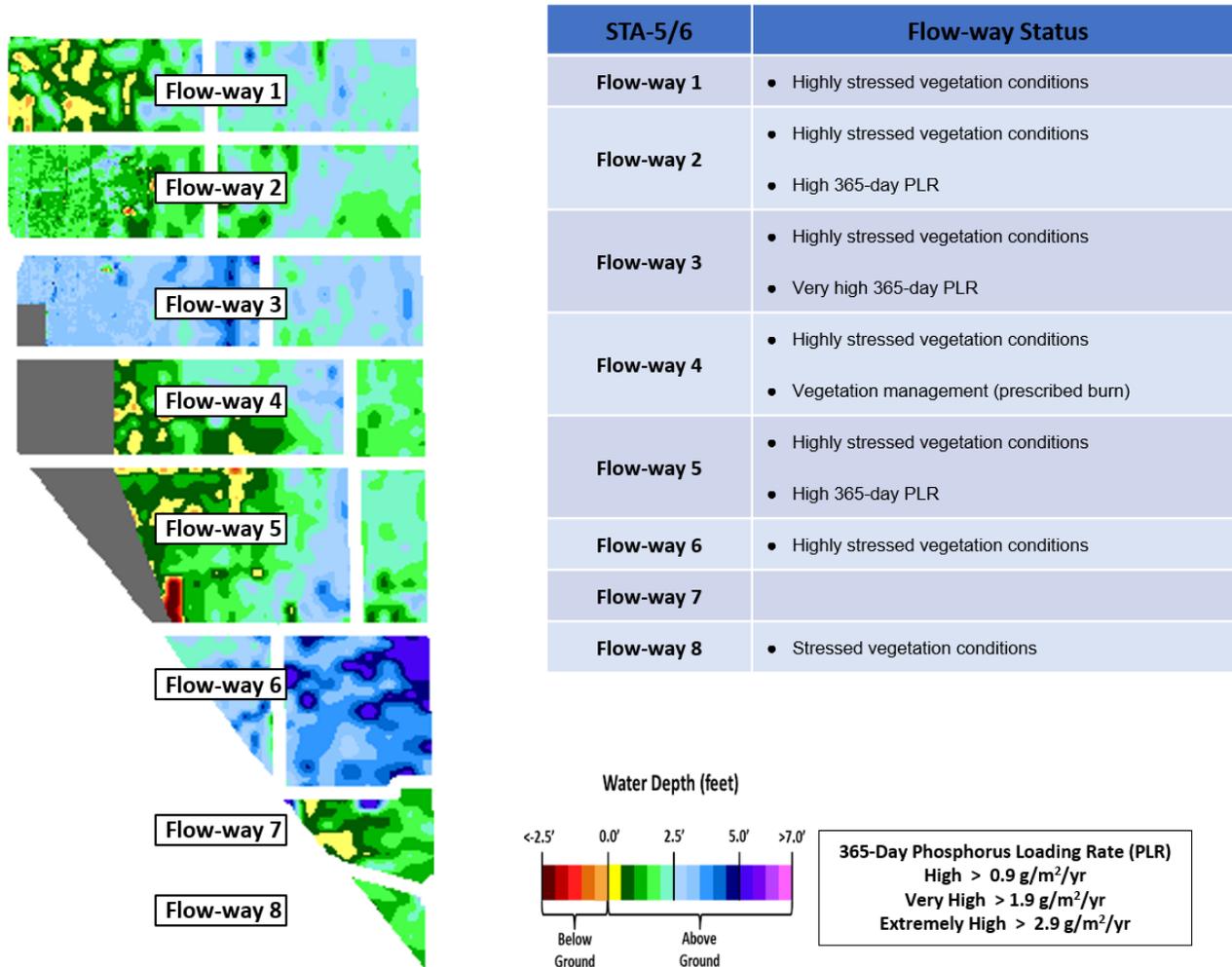


Figure S-3. Western Flow Path Weekly Status Report

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water, $\mu\text{g/L}$ or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

Once again, the EPA had much more precipitation than the previous week and stages responded. WCA-1: Last week stage within the Refuge rose just faster than the slope of the regulation line. The 3 Gauge average on Sunday was 0.43 feet below the Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge responded to rainfall and operational changes last week, rising very quickly. The average on Sunday was 0.59 feet above the regulation line. WCA-3A: The 3-Gauge average rose and then steadied late last week. The average stage on Sunday was again 0.89 feet above Zone A and 0.61 feet below the EHWL. WCA-3A North: Gauge 62 (NW corner) remained below the schedule line last week, averaging 0.07 feet below the Lower Schedule on Sunday. See figures **EV-1** through **EV-4**.

Water Depths

The SFWDAT illustrates water depths continuing to rise in southern WCA-1 and WCA-2A, and in southern BCNP the spatial extent with the potential for stages below ground contracted. Pondered conditions continue to build in the historically wet upper reaches of the L-67s and southern WCA-3A. Hydrologic connectivity is strong within all the major sloughs of ENP and has deepened considerably along SRS and the western sloughs. Comparing current WDAT water depths to one month ago, conditions in southern reaches of the WCAs are getting deeper, while southwestern BCNP and northern WCA-3A is drier. Looking back a year ago, conditions are significantly wetter in eastern WCA-3A and along the southern border of WCA-2A, and generally deeper across the EPA with western BCNP the exception (**Figure EV-5** and **Figure EV-6**).

Comparing current conditions to the 20-year average on September 24th: Well above average depths conditions continue across most of the EPA, especially in WCA-3B and northeastern ENP where conditions have remained in the 90th percentile for most of 2023. Depths are falling below average in northern WCA-2A and northwestern WCA-3A (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 2.2 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on the 17 gauges used for this report. Total weekly rainfall ranged from 0.9 inches at Little Madeira Bay (LM) in the eastern nearshore region to 4.1 inches at Garfield Bight (GB) in the western nearshore region. All stages increased across Taylor Slough, with an average increase of +0.04 feet. Stage changes ranged from 0.00 feet at EPSW in the southeastern slough to +0.07 feet at P37 and E112, in the southern and northern slough, respectively (**Figure EV-8** and **Figure EV-9**). Taylor Slough water levels are above the historical average for this time of year by +2.6 inches compared to before the Florida Bay initiative (starting in 2017), an increase of +0.3 inches from last week.

Average Florida Bay salinity was 28.0, -0.7 lower than the previous week. Salinity changes were variable and ranged from a decrease of -5.1 at Terrapin Bay (TB) in the

central nearshore region to an increase of +3.0 at Garfield Bight (GB) in the western nearshore region (**Figure EV-8**). Eastern and Central salinities remain within the IQR and Western salinities remain above the 75th percentile (**Figure EV-10**). Average Florida Bay salinity remains above its historical average for this time of year by +3.1, an increase of +0.4 relative to last week.

Water Management Recommendations

Avoiding extreme shifts in hydrologic trends and depths can be protective of the ecology of the WCAs. Careful consideration should be given to moving water out of the EPA given forecasts of a wetter-than-average dry season due to developing El Nino conditions. Depths in WCA-3A are well positioned to provide good wading bird foraging and be protective of peat soils this upcoming dry season. Keeping water within the system and flowing south has long term ecological benefits; however, operations that prevent the rate of a region’s change in stage of exceeding of 0.18 feet per week have beneficial ecological impacts within the EPA. The rapid increase in depths in WCA-2A last week was ecologically problematic, so stable depths in that basin would be beneficial. A distribution of flows into the northern WCA-3A that slowly builds water depths in that region is ecologically desirable. As conditions remain above the 90th percentile in NESRS, continuing strong positive TS creek flows to avoid salinity swings in the nearshore areas is ecologically beneficial. Individual regional recommendations can be found in **Table EV-2**.

Table EV-2. Previous week’s rainfall and water depth changes in Everglades basins.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	2.70	+0.19
WCA-2A	2.95	+0.59
WCA-2B	5.18	+0.32
WCA-3A	3.46	+0.19
WCA-3B	4.28	+0.32
ENP	2.25	+0.00
	2.70	+0.19

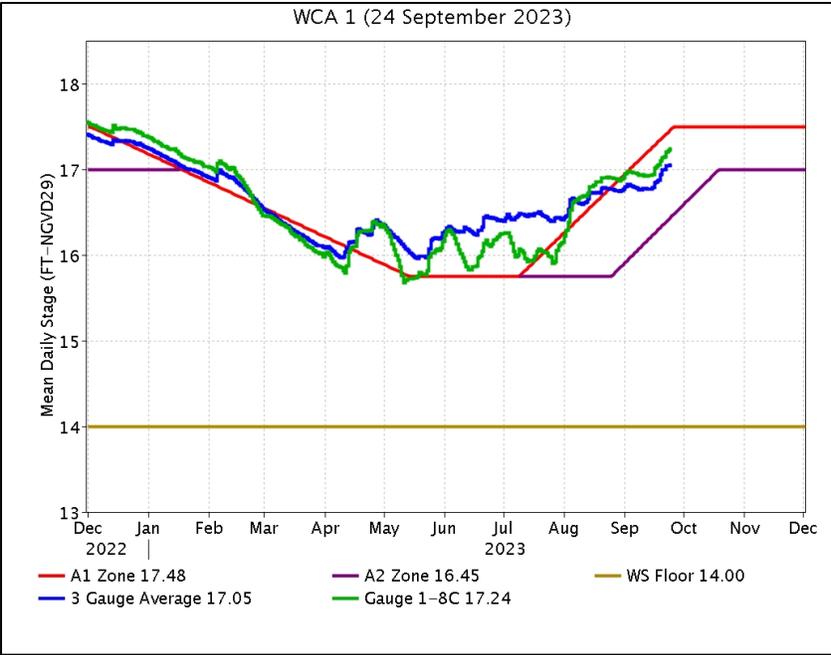


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

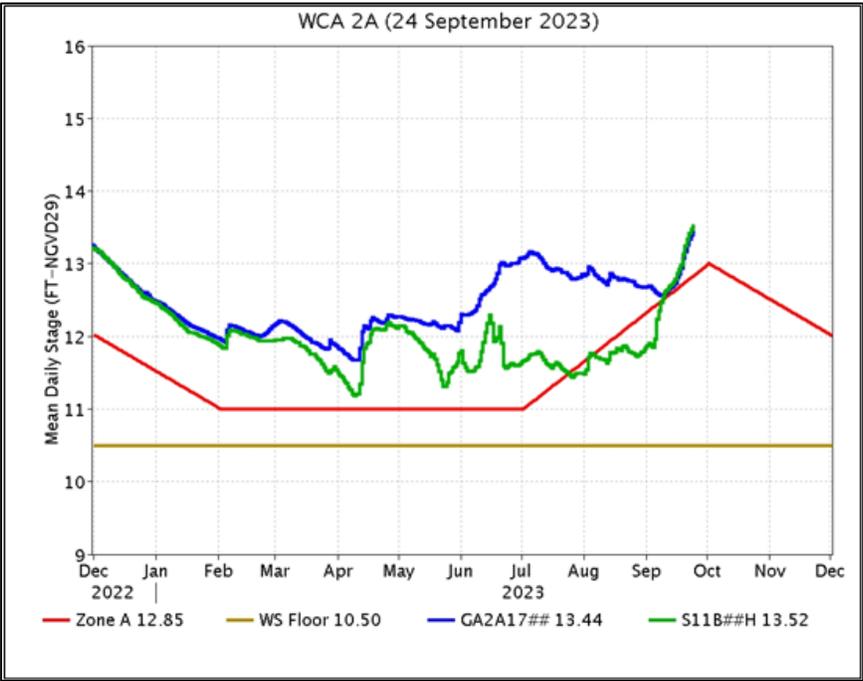


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

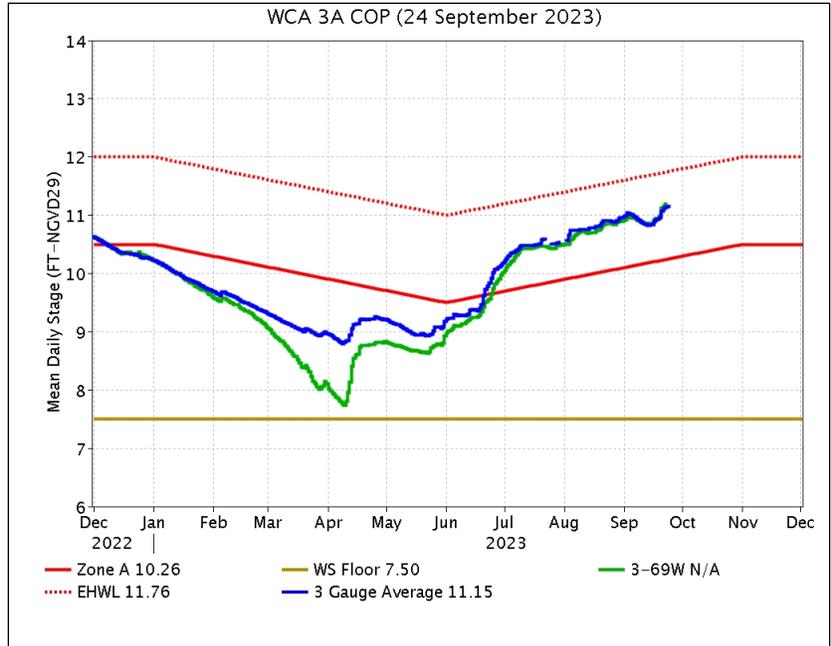


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

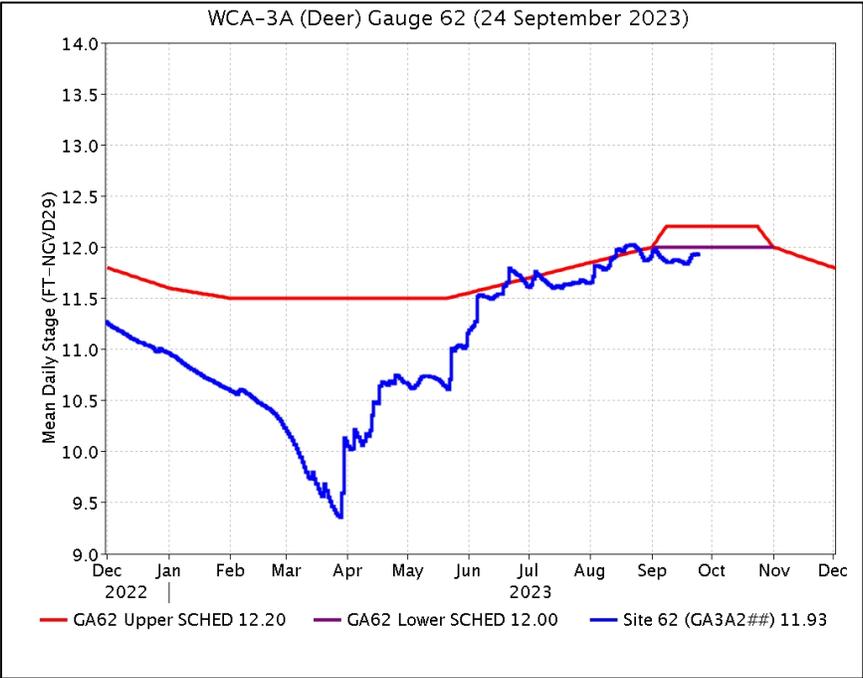


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

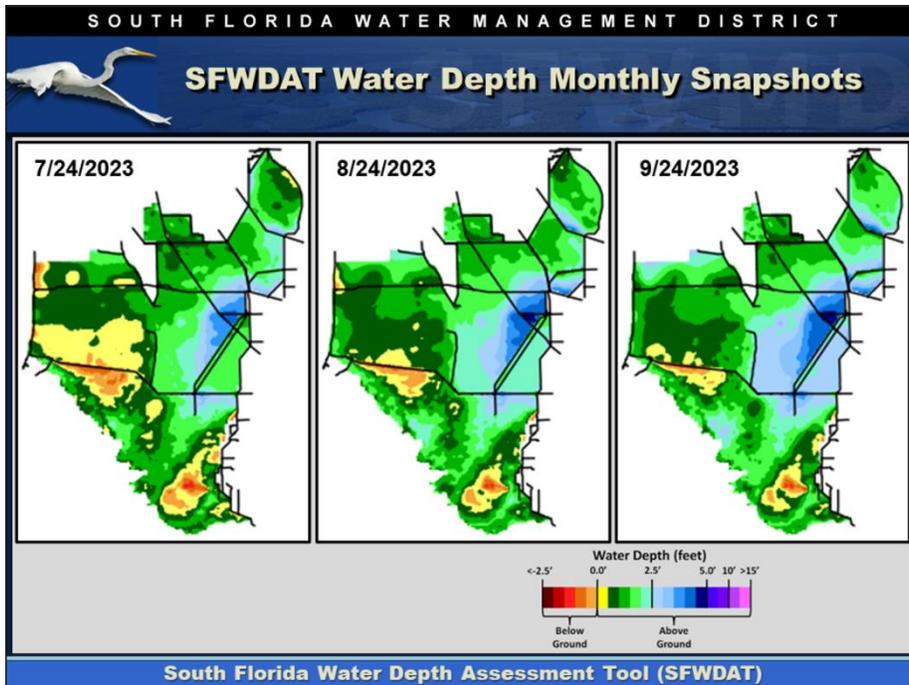


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

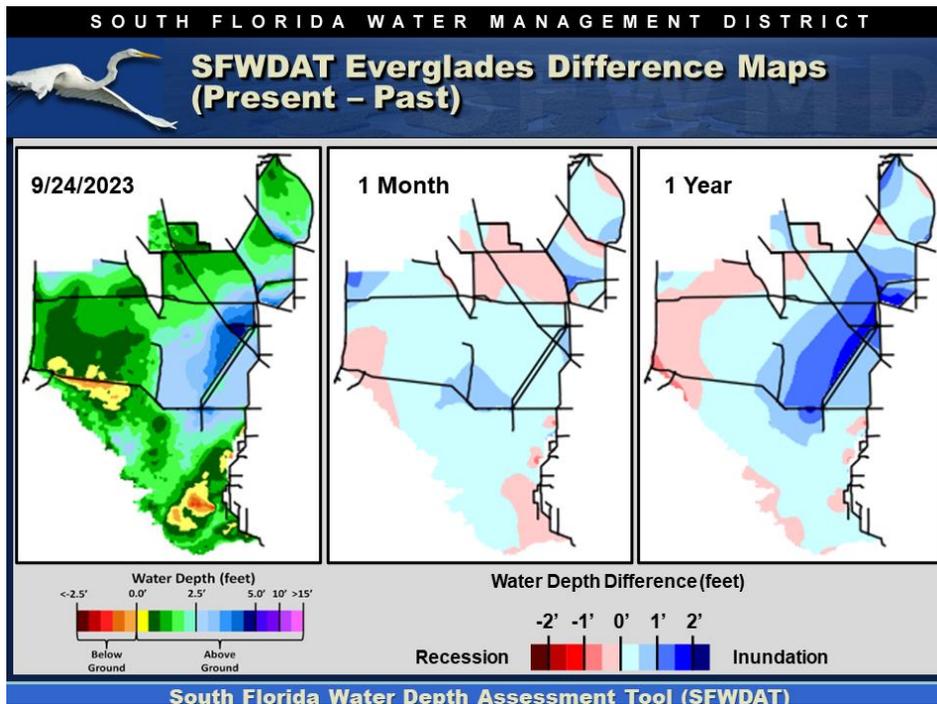


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

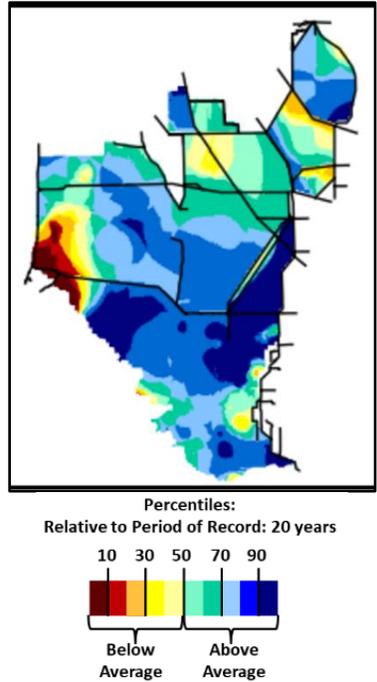


Figure EV-7. Present water depths (9/24/2023) compared to the day of year average over the previous 20 years.

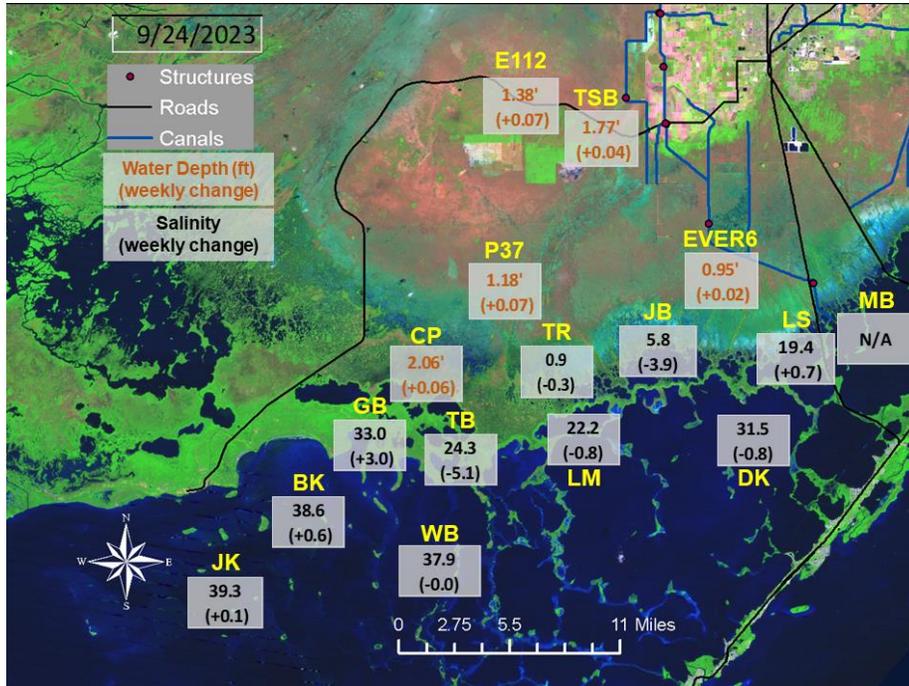


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

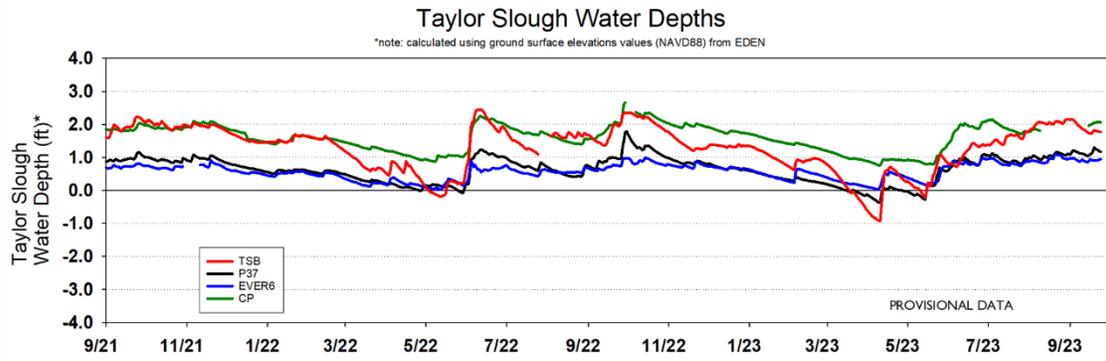


Figure EV-9. Taylor Slough water depth time series.

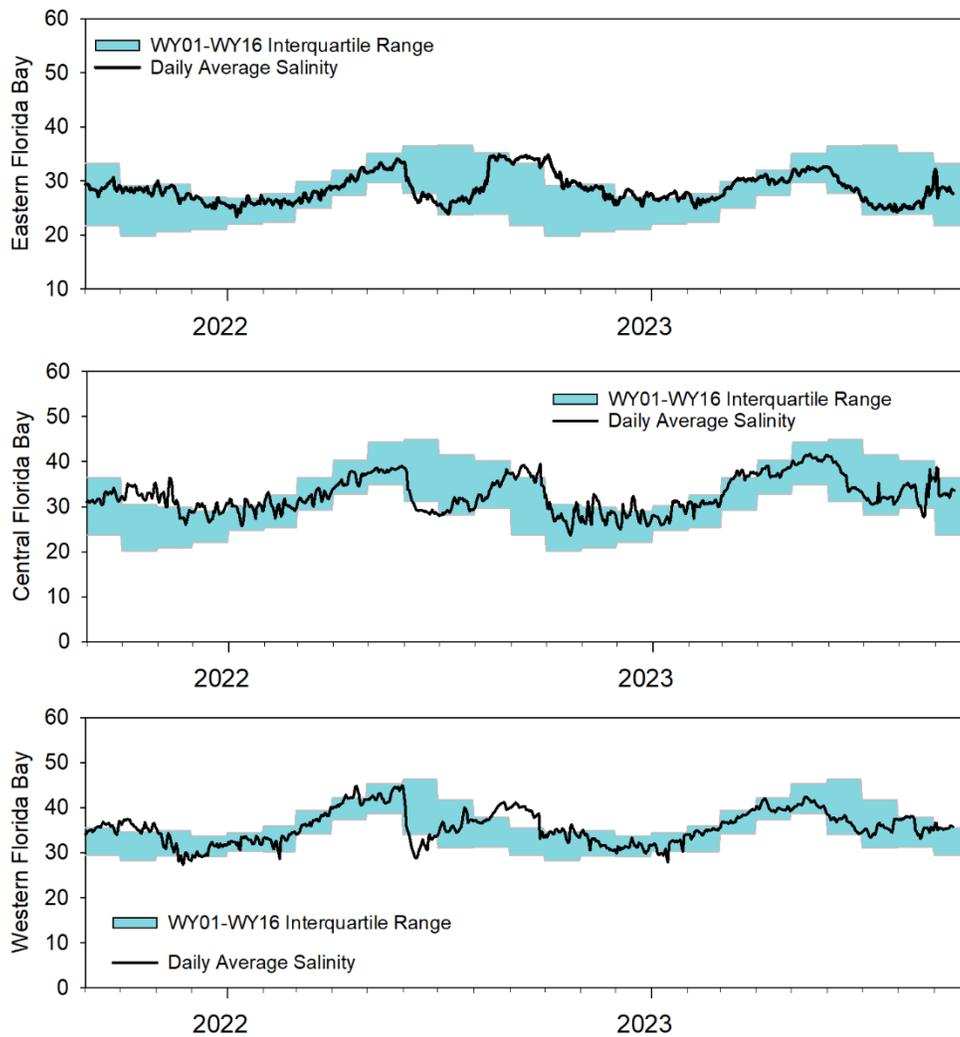


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

Table EV-2. Weekly water depth changes and water management recommendations

SFWMD Everglades Ecological Recommendations, September 26, 2023 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.19'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife (apple snail reproduction).
WCA-2A	Stage increased by 0.59'	<u>Minimal ascension rate.</u>	Protect within basin and downstream habitat and wildlife (apple snail reproduction).
WCA-2B	Stage decreased by 0.31'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife (apple snail reproduction).
WCA-3A NE	Stage increased by 0.14'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat (peat soils) and wildlife (fish/crayfish reproduction).
WCA-3A NW	Stage increased by 0.12'	Ascension rate of less than +0.18' per week.	
Central WCA-3A S	Stage increased by 0.22'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife (apple snail reproduction).
Southern WCA-3A S	Stage increased by 0.27'		
WCA-3B	Stage increased by 0.32'	Minimal recession rate.	Protect within basin and downstream habitat and wildlife (apple snail reproduction). Allow for flow through.
ENP-SRS	Stage remained unchanged.	Make discharges to ENP according to COP and TTF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife (wading bird nesting).
Taylor Slough	Stage changes ranged from 0.00' to +0.07'	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from -5.1 to +3.0	Move water southward as possible.	When available, provide freshwater to promote water movement.

Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 1,450 cfs, and the previous 30-day mean inflow was 950 cfs. The seven-day mean salinity was 24.2 at BBCW8 and 18.9 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

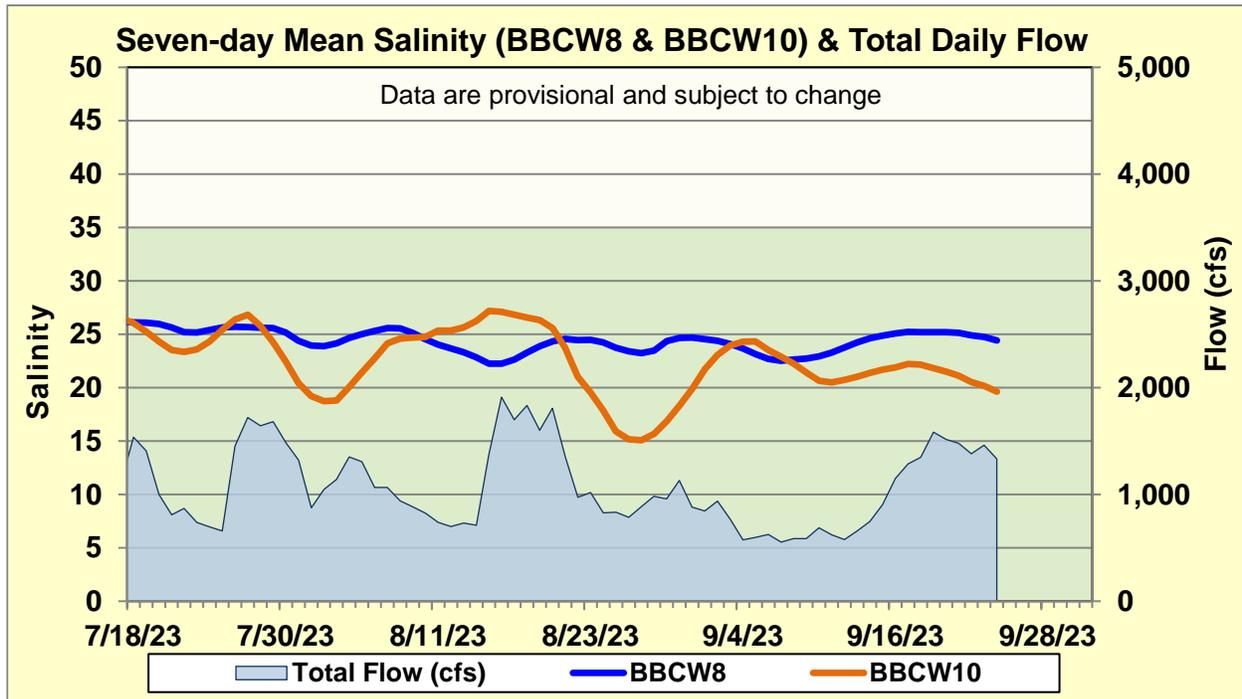


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.